

NORDIC INSTRUCTIONAL MANUAL

SECTION 3 SKILLS SECTION

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This manual has matured over fourteen years to a stage where it represents the basis of Nordic skiing techniques for Australia and how to present them to students. It is by no means a totally definitive manual. All comments are welcome direct to: Nordic Technical Director, APSI Inc apsi@apsi.net.au

INTRODUCTION



Irrespective of what snowsport discipline you teach, the progression is the backbone of your lesson. The Nordic Progression is a method of teaching skiing skills in a logical 'building block' manner. Without it, teaching Nordic skills would be disjointed and confusing.

On its own though, the progression is not enough. You still guide your guests through the steps. It will take a combination of professional attitude (Section 1) and teaching concepts (Section 2) to be able to present these steps as more than a list of exercises from easiest to hardest.

These Chapters are broken down so you can study the skills individually and see the links to the next most difficult skill as well as the skills that lead to it.

It is still important to look at the progressions holistically as they will be of benefit to your personal knowledge growth.



What is the Progression?

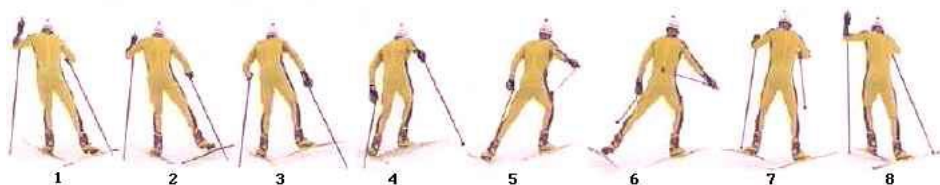
The Progression is a collection of skills with methods and some tips and tricks for teaching them. These formal methods and tricks, combined with your ability to analyse and correct technique, will help you to teach skiers to move from a beginner to a competent skier.

There are literally hundreds of tips and tricks for teaching skills. Some skiers will pick up a skill on the first trick, another when you have almost exhausted your bag of magic. You will develop your own favourite trick set from watching others teach, attending trainer's co-ordinations and recalls under senior instructors and by reading the numerous references on how to cross-country ski. You will sometimes discover a trick of your own. Please note it, refine it and pass it on.

The Nordic Progression

The Nordic Progression is broken into sets of skills. These skills are in a logical sequence of "Building Blocks", each skill leading on to the next starting with flat terrain and then progressing onto sloping terrain. Be aware that the skills may not necessarily represent the "gears" of Nordic skiing (as shown in the two tables at the end of the Manual) as some higher gears are easier to teach and some lower gears more difficult to master. This is especially so in skating.

This Manual is essentially for teaching Nordic track skills. Traditional Alpine turns, including Telemark turns, have been separated from the classical and skating track skills and given their own chapter. Although important to master at higher levels and probably desirable for touring Cross-Country, these turns are not essential Nordic track skills. Skills learnt on the track are directly transferable to ski touring; the converse is not necessarily true.



NORDIC TEACHING PROGRESSION SUMMARY

Equipment familiarization	boots skis poles
Flat Skills	Stance Falling and recovery Stationary skills with skis on
Diagonal stride	Walking Walking and pushing with poles Changing direction on the move Stride and glide with pole push
Climbing steeper terrain	Uphill diagonal stride Herringbone Sidestepping on slopes
Straight running	Tucks
Double Poling	Advanced double poling Stride double pole technique

Traversing	
Speed control & stopping	<p>The snowplough Single plough speed control Double plough speed control Snowplough stop</p>
Turning on the move	<p>Snowplough turns Step turns</p>
Skating	<p>Free-skate w/o poles Marathon skate Skate turn Offset Skate Herringbone skate Double time Single time</p>
The Nordic Downhill Techniques	<p>Basic Christie Side slipping Stem Christie Pole planting Basic Parallel Turns Telemark</p>

SKILL CLUSTERS

Another method of looking at Nordic skiing skills is in ‘clusters’ or ‘blocks’. The skills can be grouped. Note that these blocks are similar to, but not the same as the teaching progression, but represent logical groupings based on terrain use and skill type. These Blocks are included as a handy way to refer to skills grouped this way.

SKILL CLUSTERS FOR CLASSICAL TECHNIQUE

- **BLOCK 1** **INTRODUCTORY / SURVIVAL SKILLS**
 - **BLOCK 1A** **STANCE**
 - **BLOCK 1B** **FALLING AND RECOVERY**
 - **BLOCK 1C** **STATIONARY SKILLS WITH SKIS ON**

- **BLOCK 2** **FLAT SKILLS**
 - **BLOCK 2A** **FROM WALKING TO STRIDING WITH GLIDE**
 - **BLOCK 2B** **STRIDING, GLIDING AND PUSHING WITH POLES**
 - **BLOCK 2C** **CHANGING DIRECTION ON THE MOVE**
 - **BLOCK 2D** **DOUBLE POLING**

- **BLOCK 3** **SLOPE SKILLS**
 - **BLOCK 3A** **UPHILL DIAGONAL STRIDE**
 - **BLOCK 3B** **HERRINGBONE**
 - **BLOCK 3C** **SIDESTEPPING**
 - **BLOCK 3D** **SNOWPLOUGH GLIDE AND BRAKE**

- **BLOCK 4** **MANOUVRE SKILLS**
 - **BLOCK 4A** **STEP TURNS**
 - **BLOCK 4B** **SNOWPLOUGH TURNS**

- **BLOCK 5** **ADVANCED SKILLS**
 - **BLOCK 5A** **DEVELOPING STRIDING POWER IN THE TRACKS**
 - **BLOCK 5B** **ADVANCED DOUBLE POLE**
 - **BLOCK 5C** **STRIDE DOUBLE POLE**

SKILL CLUSTERS FOR SKATING TECHNIQUE

- **BLOCK 1** **INTRODUCTORY SKILLS**
 - BLOCK 1A STANCE
 - BLOCK 2B EDGING
 - BLOCK 2C THE DIVERGING VEE

- **BLOCK 2** **FLAT SKILLS**
 - BLOCK2A FREE SKATE WITHOUT POLES
 - BLOCK 2B MARATHON SKATE
 - BLOCK 2C OFFSET SKATE WITH POLES

- **BLOCK 3** **SLOPE TECHNIQUES**
 - BLOCK 3A OFFSET SKATE WITH POLES
 - BLOCK 3B HERRINGBONE SKATE

- **BLOCK 5** **ADVANCED SKATE TECHNIQUES**
 - BLOCK 5A DOUBLE TIME
 - BLOCK 5B SINGLE TIME
 - BLOCK 5C FREE SKATE
 - BLOCK 5D TUCK SKATE

- **BLOCK 6** **CORNERING**
 - BLOCK 6A SKATE TURNS WITHOUT POLING
 - BLOCK 6B SKATE TURNS WITH POLING

SKILL CLUSTERS FOR DOWNHILL TECHNIQUES ON NORDIC SKIS

- **BLOCK 1** **THE CHRISTIE**
 - **BLOCK 1A** **BASIC CHRISTIE**
 - **BLOCK 1B** **SIDE SLIPPING**
 - **BLOCK 1C** **STEM CHRISTIE**

- **BLOCK 2** **POLE PLANTING**

- **BLOCK 3** **PARALLEL TURNS**

- **BLOCK 4** **TELEMARK TURNS**
 - **BLOCK 4A** **STANCE**
 - **BLOCK 4B** **LEAD CHANGES**
 - **BLOCK 4C** **BASIC LINKED TURNS**

Beginner Skiers

Beginner Nordic skiers will fall into several categories:

- First time on snow skiers
- Children
- Alpine skiers
- Snowboarders who have not skied before
- The mature first timer

There will also be ‘cross-country’ skiers or “tourers”, some of whom may have been skiing for many years, usually self-taught or taught by friends. Many times, these are “bushwalkers on skis” and may have bad habits that may have to be broken and re-set.

Fitness is one of the major factors to consider when dealing with all Nordic skiers, beginners especially, as they usually underestimate the high aerobic demand of this activity. Always be wary of the progress of your students during a lesson from this viewpoint. Over dressing, poor hydration and high energy expenditure when “trying” Nordic skiing can turn a client off the sport forever, whereas a gentle, well-paced introduction with realistic expectations of progression can have the beginner keen to return to improve their skills.

Alpine skiers will generally possess some dynamic balance skills but common skills such as stance, snowplough and skating will be foreign to them on free-heel skis and they may require some re-education.

In a standard 90 minute lesson, a realistic expectation for a fit active beginner may be to go away being comfortable to walk around on the flat with a little glide and pole push; be able to climb gentle hills with a mixture of techniques and feel safe to descend the same hills with speed control and basic manoeuvring skills. Should they get themselves into trouble, they need to have had an introduction to skills like side stepping to enable them to minimise danger and maximise safety.

An older less fit beginner might only get to shuffling around on the flat. The same may apply to the very young skier.

Equipment Familiarisation

It is important that beginners are familiar with their equipment and the correct method of employing it. Nordic bindings are not all the same and snow or ice packed under a boot or in a binding can create frustration. Explain how to clear snow from boots and get in and out of bindings as well as how to assist others such as the elderly and small children. Boots that often expand and loosen during the lesson can also be a problem. Use a convenient break in teaching to assist skiers to check this.

Pole straps and how to adjust and wear them for efficient use is a necessary demonstration. Like bindings, they don't all adjust in a common manner and are often jammed too tight or too loose when hired. Show the students how to adjust the straps and grip the poles correctly.

The camber and the purpose of the grip zone (pattern base) on Nordic skis is worthy of explanation as part of your introduction. If the skier understands that a "bridged" ski will slip and not grip, they can avoid the issue before it becomes a problem.

Nordic Ski Trails

It is important that beginners are also familiar with the way Nordic tracks are set and why. Trails in resorts are machine groomed with a smooth and a level corduroy finish. Twin classic tracks are also machine groomed and set on the left- or right-hand side, or both sides of the wider corduroy path. These tracks are usually between 60-70 mm wide and are designed for lightweight "track" skis. Skis that are wider than 60 mm will quickly destroy the tracks and must not be used in the tracks.

The twin classic tracks if well set, will allow a skier to do a straight downhill run without needing to step out of the track. The tracks also act as a guide like tram tracks that aid the skier in maintaining direction and stop them from slipping sideways when going uphill or along the flat.

In most northern hemisphere resorts, classic tracks are set on the left side only indicating a one-way trail system. Where tracks are set on both sides, it generally indicates a two-way trail system.

Teaching the Beginner

The Introductory and Survival Skills from the Progression are fundamental for beginner skiers. Time spent on the basic balance and manoeuvring skills will pay dividends when the student starts to stride around on the snow. Fall and Recovery drills are essential for the less fit and older skier. Older skiers generally lack flexibility and may need individual coaching in the best technique for them to get up after a fall that will otherwise sap their energy.

Diagonal Stride is the basic skill for moving over the snow and students who express a desire to “skate” before mastering the “striding” and associated speed control and manoeuvring skills might be counselled to re-consider. Classical skiing technique provides foundational skiing skills of balance and timing which naturally flow onto skating. Rapidly transitioning to skating can be initially very frustrating for the student, particularly if they have poor balance, and can put many young skiers off Nordic forever.

The Return Skier

Students who return wanting to improve their skills should be observed carefully to assess their strengths and weaknesses prior to ‘fitting’ them into the progression for improvement and skill development. A suggested method for analysis of technique is in the “Analysis of Technique” section that follows.

THE ANALYSIS OF TECHNIQUE

The most important factor in cross country technique is not the static body positions themselves but how the skier moves between body positions. For example, a good bend at the hip, knee, and ankle in the leg push of the diagonal stride is of little use if the skier does not follow through powerfully from that position.

In most cases, Nordic technique involves a rapid muscle movement followed by a substantially longer relaxation phase. For example, in the arm push of the diagonal stride, the upper back muscles rapidly move the shoulder and pole down and back for propulsion. However, the muscle relaxes in the subsequent follow-through and return of the arm forward. In summary, the rapid, powerful actions of the muscles increase the quickness with which technique is executed and relaxation increases its efficiency.



Steps in the Analysis of Technique

Analysing technique consists of detecting and correcting errors. There are four steps to consider in the analysis:

- Step 1 — repeat the technique several times so that the skier can be viewed over several repetitions from different angles and a clear picture of the relevant skill can be gained.
- Step 2 — first, focus on the general performance of the skill, and correct fundamental problems; correcting these problems will eliminate many smaller but related problems. Then move on to smaller, specific problems.
- Step 3 — incorporate the principles of the skill when you are correcting errors. Drills to help skiers improve their skills are included in the individual sections on technique.

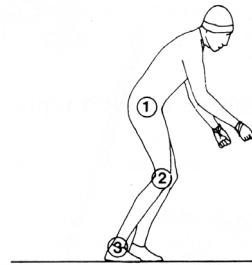
- Step 4 — give skiers plenty of opportunity to practise and offer feedback regularly when trying to overcome a technique problem.

Once an error has been corrected, use these four steps again to examine the next most fundamental error in technique. If you find that you cannot correct an error, try some new methods of describing the problem or some new drills.

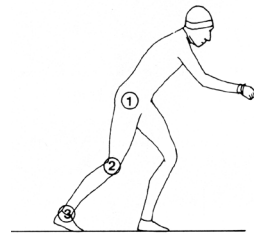
Some Biomechanical Principles Specific to Skiing

Movement of the body and the performance of a skill are governed by the physical laws of biomechanics. The following three principles of biomechanics are particularly useful in the analysis of skiing technique.

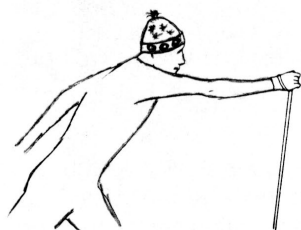
Principles #1 — use all the joints that can be used. To produce maximum effect, the forces from each joint must be combined. This combination is optimal when all the joints that can be used are used. For example, obtaining a powerful leg push in the diagonal stride requires extending each of the hip, knee, and ankle



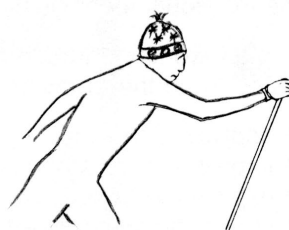
Principles #2 — use every joint in order. Skiers should use joints that have large muscles attached to them and use those in the centre of the body before using joints with small muscles attached to them (joints with smaller muscles attached to them are at the ends of the arms and legs). Using joints in the proper order ensures that motion is fast and continuous. For example, in the leg push of the diagonal stride, the hip is first to extend; then the knee extends, and finally the ankle extends.



Principles #3 — check for preliminary movements. When analysing a problem in technique, make sure that the correct preliminary movement has occurred. For instance, if a skier is not getting much poling power from his or her arm, the problem could be in the preliminary arm movement — the arm might be straight when the pole is planted, and the elbow would therefore be unable to provide power in the poling action. The correct arm movement at pole plant is a bent elbow that straightens in the stride and provides better poling power.



a) Incorrect



b) Correct

Symptoms and Errors

When correcting a skier's technique, focus on the error, not on its symptoms. The need for the proper focus in this area is perhaps best understood by considering an analogy.

Imagine that your car has just run out of fuel. The fuel gauge registers empty, and the fuel tank is empty. Changing the fuel gauge so that it showed full would not solve the problem — only filling the fuel tank would. Focusing on the fuel gauge is like focusing on the symptom of an error in technique; filling the fuel tank focuses on the problem.

Think about how to correct a skier who does not have a quick and forceful leg push. Rather than tell the skier to straighten the knee fully in the leg push (the visible symptom), tell him or her to push quickly and forcefully — and so straighten the knee and produce the dynamic action required in the stride!

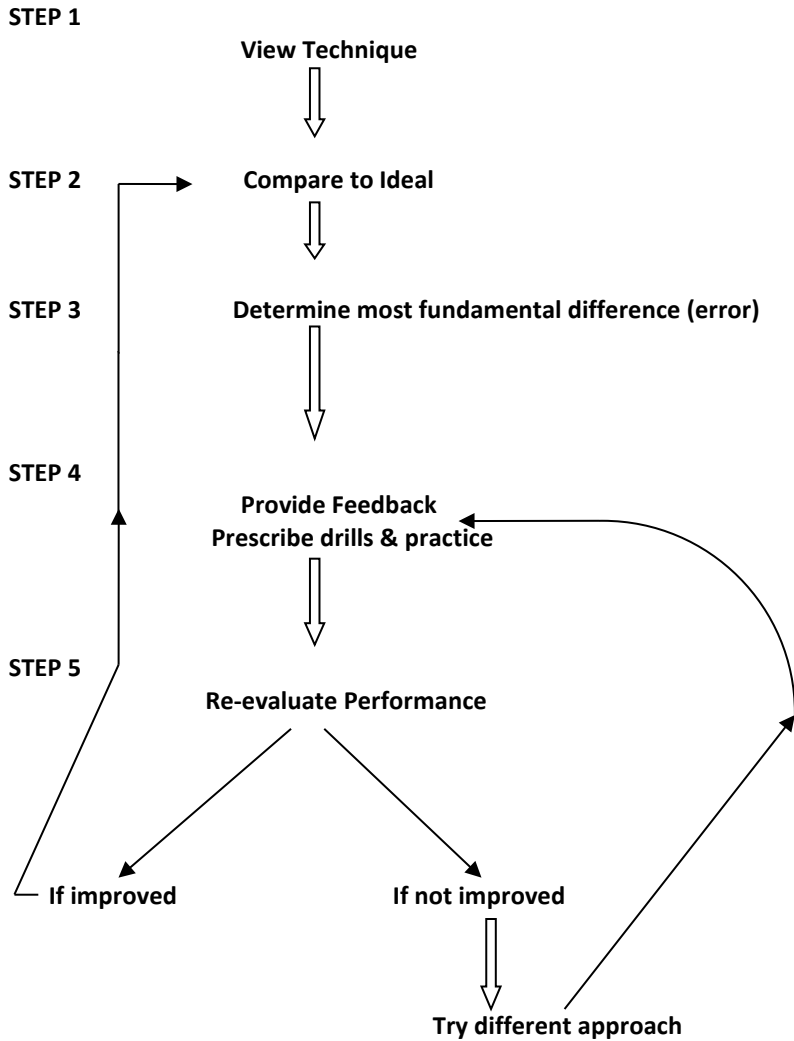
Another example of the need to focus on errors involves the glide in the diagonal stride. The glide may not be long enough; however, inadequate glide may be a symptom of an error, such as inadequate power in the leg push.

Good technique depends on good balance and agility, and both come only with a lot of practice. There are many basic drills for balance that will be helpful to the novice skier and some more advanced drills that will be helpful for the advanced skier.

All the drills teach basic skills — for example, weight transfer, edging, and balance — that are important components of many cross-country techniques. The drills can also be used as warm-up exercises at the beginning of practices.



Steps in the Analysis of Technique



INTRODUCTORY AND SURVIVAL SKILLS

What are Introductory / Survival Skills

Introductory and survival skills are those skills that introduce the beginner skier to basic stance and limited movement skills on Nordic equipment. Included are skills to assist the beginner in falling safely and getting back on their feet with minimal effort.

What are the Mechanics of Introductory / Survival Skills

- Stance, small, controlled movements and coordination are the basic mechanics of Introductory Skills.
- Ankles, knees and hips comprise the shock absorption system. Adopt an “Alpine” stance even though you can stand up straight.
- “Little is better than Big” – make many small movements rather than a couple of large ones.
- “If you Lift the Tips out of the Snow, then the Skis will Know where to Go” – a dropped toe will hinder movement of the skis.
- As a general rule, particularly for beginners, keep three points of contact on the snow – two skis one pole, two poles one ski.

Why do we teach Introductory / Survival Skills

To most Australian first time Nordic skiers, having long, narrow skis and wearing soft boots, attached only by the toe, is quite foreign. A slippery snow surface adds another strange dimension. Introductory and survival skills give the skier familiarity and confidence with the equipment and environment and provide a basic platform to progress to effective and safe movement across the snow.

Where do we Teach Introductory / Survival Skills

Introductory and Survival Skills are taught on flat terrain, preferably groomed. Icy surfaces are to be avoided.

What Previous Experience is needed before attempting Introductory / Survival Skills

First time skiers should be familiar with the basic mechanics of their equipment, particularly “camber” and the grip zone of the ski; have their pole straps correctly adjusted and positioned and be able to put on and remove their skis.

How do we Teach Introductory / Survival Skills

Introductory and Survival Skills are taught in a close-knit group by instructor demonstration and student repetition. Games can be introduced, particularly for children.

Safety Considerations

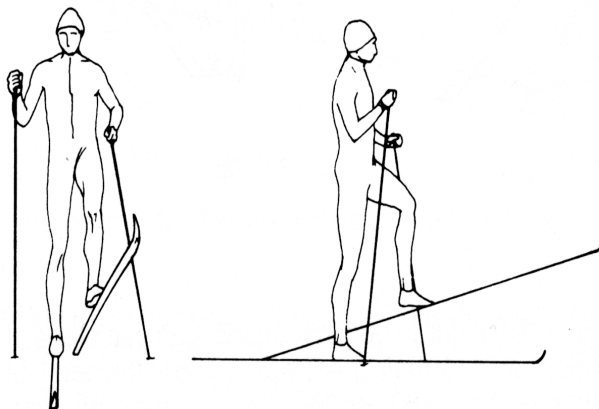
Flat terrain is essential at this early stage of skiing.

Progression for Introductory / Survival Skills

(note: it is usual to introduce these skills with poles but with young children, it is sometime beneficial to leave poles out of the equation until late in the lesson)

- Stance: introduce the concept of legs as shock absorbers, ankle flexion and flat skis.
- Falling and Recovery: fall from a low position, sideways and to the rear, onto your buttock. Recover by untangling the equipment (dead ants) and placing the skis parallel across the fall line and getting weight over or forward of the bindings. Get up by squatting or kneeling forward.
- Balance on one ski: Introduce the concept of shifting the hip, not leaning the trunk.
- Side Stepping: make many small movements, not large ones. Place poles on the ground parallel to and beside skis and step over them and back.

- Star Turns: Lift the tips and anchor the tails of the skis, lift using the knees and ankles, the hips remain stable.



- Reverse Star Turns: Lift the tails and anchor the tips of the skis.
- Snow Brushing: Brush parallel then in a wedge as in a one-foot snowplough.
- Hops: hop from one ski to the other then hop both skis using 'suspension'.
- Kick Turns: teach as a drill – take care with older skiers and those with 'dodgy' knees.

Drills:

- Repetition by students of instructor demonstrations.
- Fall and recover on flat terrain then move to a slope and practise on the fall line.
- Move in and out of set track, one foot at a time.
- Stand in the track and brush one foot out in the snowplough position.
- Make a clock face with steps.
- Star Turn around a planted pole or cone/flag.
- Place poles on the ground parallel to and beside skis and step over them and back.
- Sideways Hops using poles as props.
- Games – especially for children.

Common Problems and some Solutions for Introductory / Survival Skills

Error	Correction
Stance: too stiff and upright	Emphasise bending (flexing) the ankle. Bounce your torso up and down slightly, focusing on feeling pressure underneath the balls of your feet. Do gentle squat movements
Toe Drop on Star Turns	Feel pressure of toes on the top front of the boot when lifting the foot
Reticence to move one ski freely. Inability to balance on one ski to 'brush' or step in and out of the track.	Move the weight to the side and off one leg using the hips not the upper body
Inability to get up from a fall (particularly the LARGER and OLDER skier)	Skis must be across the Fall Line Centre of Gravity must be over or forward of bindings Crawl forward and get up over skis on one knee.

SIDE STEPPING

What is Side Stepping

Side stepping is the lowest gear for moving across snow.

What are the Mechanics of Side Stepping

The Side Step is achieved by stepping up or down an imaginary staircase that is across the Fall Line. Small movements and strong edging is used to maintain stability.

Why do we Teach Side Stepping

It is the lowest gear and can be used to ascend and descend very steep terrain safely when other techniques fail.

Where do we Teach Side Stepping

On Steep terrain with an even Fall Line.

What Previous Experience is needed before attempting Side Stepping

Introductory / Survival Skills and Traversing.

How do we Teach Side Stepping

- Side Stepping is taught by demonstration, practise, error detection and correction.
- Use slopes of increasing steepness.
- Maintain Right Angle of skis to the Fall Line.
- On steeper slopes encourage strong edging and “stamping in”.
- Maintain three points of contact on the snow, at least initially and always on steeper terrain.
- Practise Side Stepping up and down.



Safety Considerations Side Stepping

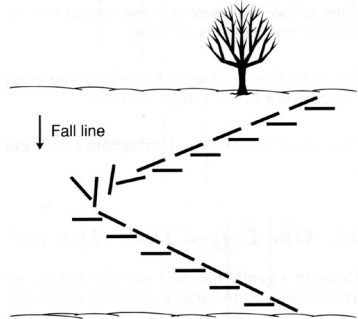
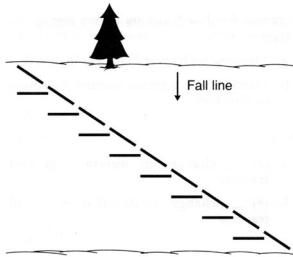
Safety on steep slopes.

Progression for Side Stepping

- The skier stands flat on the skis with the feet side by side.
- Slump into a low stable stance, round the shoulders and tilt the pelvis forward.
- Step up and down the slope with small sideways movements maintaining the skis parallel and across the Fall Line.
- On steeper slopes encourage strong edging and “stamping in”.

Extensions to Side Stepping

Half Herringbone ascent and Zig Zag Traverse ascent with tacking turns



Drills:

- Create a square route, up a slope, along and down and across then up again.
- Encourage rhythm in use of poles and skis.
- Try “blind” sidestepping.
- Cut a small up and down staircase, sidestep up, kick turn on top, sidestep down the other side.

Common Problems and some Solutions in Side Stepping

Error	Correction
Side slipping	Stronger edging required
Sliding forwards or backwards	Maintain right angle with the Fall Line

DIAGONAL STRIDE

What is Diagonal Stride

Diagonal stride is the basic technique for forward movement over the snow on almost all flat and uphill terrain and in almost all conditions.

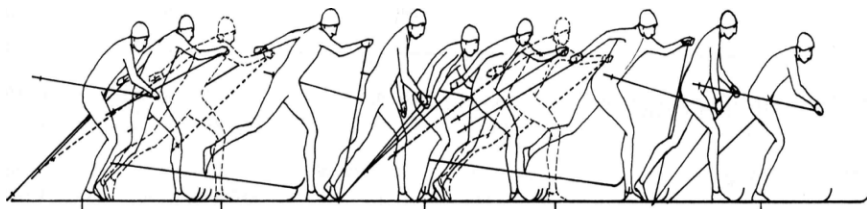
What are the Mechanics of Diagonal Stride

The skier first flexes slightly and then pushes off from one leg and glides on the other. The next stride begins with a flexion of the glide leg then a push off that same leg. The arms move in sync with the legs.

The push off requires the skier's weight to be placed down through the foot onto the snow.

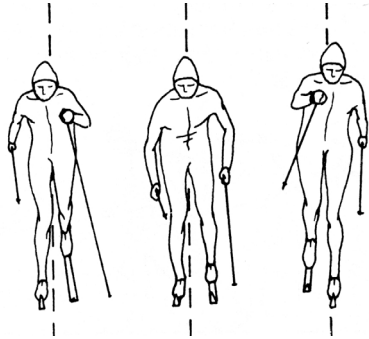
The legs should bend at the hip, knee and ankle during flexion. The trunk leans forward throughout the flexion and glide cycle.

The glide action lasts for about three quarters of the stride. It begins when the push leg leaves the snow and ends when the push leg returns to the snow as the legs come together.

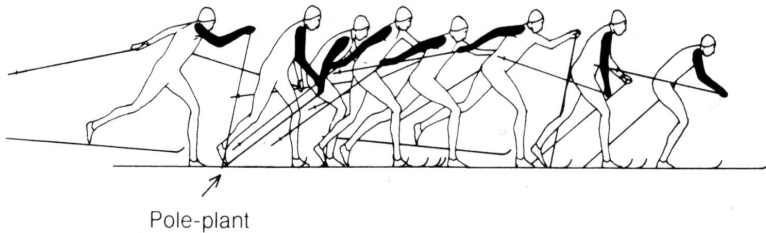


The most important part of diagonal stride is the weight shift. After the push off and until the ski slows down, the skier's weight remains entirely on the gliding ski. As the legs pass again, the weight is transferred to the other ski. The end of the push off completes the weight shift.

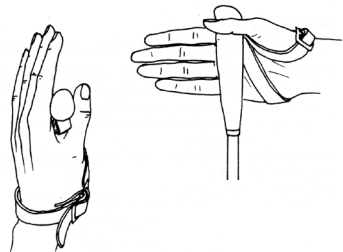
Weight shift has two elements. First, the skier's body must move over the gliding ski for weight shift to occur. Second, if a complete weight shift is to be maintained, the body and hips must be high and forward over the glide ski.



The Arms. The arms provide the power in diagonal stride. The pole is planted slightly in front of and across from the opposite side glide leg as the other leg reaches its most rearward position. The arm pushes down and back helping to push the upper body over the glide leg. The pole leaves the snow after the shoulder, elbow and wrist have extended.



Note that the pole straps should be adjusted so that the pressure on the pole can be exerted through the strap without gripping the handle too firmly. At full extension, the pole should only be held between the thumb and forefinger. The cycle is then repeated. The arms and legs move with each other in the same way as normal walking.



Why do we Teach Diagonal Stride

Diagonal Stride is the key skill in movement across snow on cross country skis. It is taught to enable skiers to move forward efficiently in most snow conditions with energy conserving glide and best use of all the body's muscle groups.

Where do we Teach Diagonal Stride

Diagonal stride is taught on flat terrain and gently rising terrain. The ideal snow preparation is a groomed surface with set track.

What Previous Experience is needed before attempting Diagonal Stride

Before learning to diagonal stride, skiers should be familiar with their equipment, be comfortable with the correct stance, have practiced falling and recovery and stationary skills on their skis.

How do we Teach Diagonal Stride

Diagonal stride is taught using a series of simple progressions (below). Commence with simple walking, making sure the skis move straight ahead. From walking, progress to walking with trunk lean to induce glide. More glide is then induced with weight shift and pause on the gliding ski. "Push" and "drive" with the legs is then introduced followed by effective use of the arms and poles. Progress to steeper terrain.

For fitter skiers, Diagonal Stride may be taught by "running" or "bounding" on the skis but it is important that the skis are not lifted off the snow.

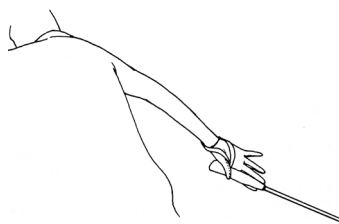
Safety Considerations

Many first timers will be uncomfortable with descending even the gentlest slope but will comfortably stride up it. Depending on terrain and students, speed control skills like snowplough glide and brake can be taught in conjunction with striding.

Progression for Diagonal Stride

(note: it is usual to commence the diagonal stride progressions without poles but some first timers, especially older skiers, are uncomfortable with this and the progression can be modified to accommodate them)

- Adopting a static diagonal stride position and then changing with a scissor action to the other side
- Walking on skis concentrating on short strides and parallel skis.
- Walking with trunk lean and free-swinging arms.
- Pause and glide with weight shift onto the gliding ski.
- Flex the body, push with one leg, drive and glide with the other.
- Introduce the poles carried and swung in the hands.
- Pole plant and push to an extended arm and hand.
- Emphasise, examine and refine timing between legs and arms.
- Progress to steeper terrain, increasing tempo and shortening arm and leg movements on hills.
- Changes of direction are made using the “star turn” technique encouraging small changes of ski direction to retain stability.



Drills:

- Scootering with one ski removed then both skis:
- Stride, Stride, Glide.
- Arms only drill (short periods on level terrain only).

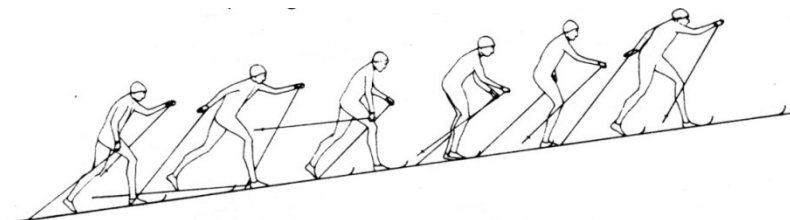
Common Problems and some Solutions in Diagonal Stride

Error	Correction
Poor Timing: Uncoordinated arm-leg action results in poor timing. Poles may be being used for balance like props.	Remove poles and jog along the track pumping arms naturally. An increase in tempo usually corrects poor timing. Short steps up an incline can also help.

Error	Correction
Shuffling: Lack of weight transfer causes excessive shuffling.	Balance on one ski at a time, even for a second or two. Shift weight completely over each ski to improve balance.
Ski Slapping: The ski slaps onto the ground as weight is being transferred. An upright stance forces the ski to hit the track too early and therefore too far back.	Move the hips forward to balance on the gliding ski. Use some dorsiflexion (toe lift) as the ski is driven forward. "Flare" the ski onto the snow.
Slip: The ski slips as the skier moves forward, especially on a hill. Generally, the push off is too far behind the other foot. Too hunched a body position will also affect the ability to push off effectively.	Move hips forward to eliminate the hunched position. Push off when skis are side by side. Skis may be too stiff for the skier or if grip waxed, wax might be too short.

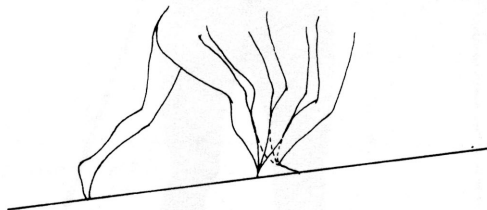
UPHILL DIAGONAL STRIDE

The uphill Diagonal Stride is an extension of Diagonal Stride. It is used to climb mild to moderate uphill grades. As the skier skis uphill from flat terrain, glide decreases and adaptations are necessary to the basic Diagonal Stride.



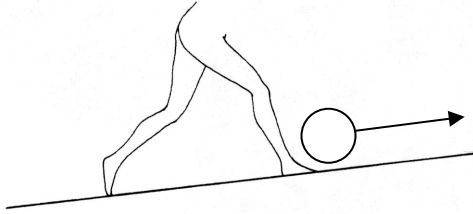
Adaptations for Uphill Diagonal Stride

- Increase tempo to essentially not give the skis time to lose grip.
- Induce a more pronounced weight shift – push the Centre of Gravity not only forward over the glide leg but up the hill.
- The trunk is carried in a more upright position relative to the snow
- Shorten the arm action
- Drive the glide foot up the slope at the end of the leg push
- Keep the knee angle fairly constant during the glide to prevent the hips from dropping back



Drills for Uphill Diagonal Stride

- Practise gradually adapting the diagonal stride on successively steeper hills
- Pretend to successively kick a soccer ball up the hill when driving the glide leg forward.



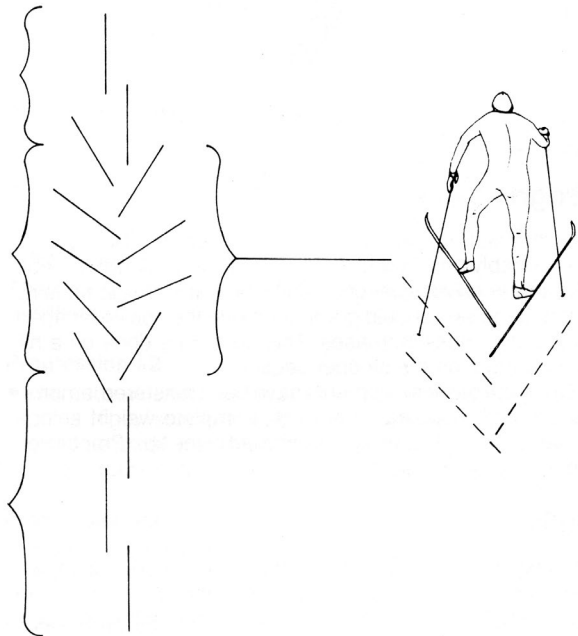
HERRINGBONE

What is Herringbone

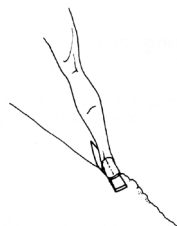
The Herringbone is a technique used to climb hills when the steepness causes skis to slip when doing Diagonal Stride.

What are the Mechanics of Herringbone

- Herringbone can be described as diagonal stride with ski tips out to the sides in a Vee. The tracks left in the snow resemble a herringbone pattern.
- The steeper the slope, the wider the Vee.
- As in Diagonal Stride, the weight is shifted from ski to ski. All the weight is placed on one ski whilst the other ski is walked up the slope.
- The skier powerfully pushes off one ski and then transfers it to the next ski, effectively walking or marching up the hill **without** glide.
- Poles are planted slightly further to the sides and further back than in Diagonal stride.



- To get a solid base for the herringbone, the skis must be “edged” by slightly dropping the knee and ankle into the hill.
- The steeper the hill, the more edging that is required.
- Skis are kept low and close to the snow during the action.



Why do we Teach Herringbone

Herringbone is a low gear for moving up steeper terrain or across heavier snow. It is the first gear in the gearbox, but like Diagonal Stride it can be adapted to variations in terrain. One common adaptation is the half-herringbone which has one ski pointing straighter up the hill, either used to directly go up the slope or as a climbing traverse. Herringbone is a necessary technique for climbing steep hills.

Where do we Teach Herringbone

Herringbone is taught on medium to steep terrain but not across a Fall Line.

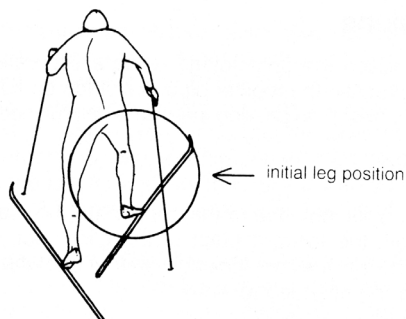
What Previous Experience is needed before attempting Herringbone

Introductory/Survival Skills and Diagonal Stride are essential.

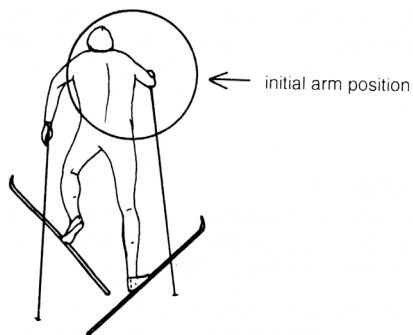
How do we Teach Herringbone

Herringbone is taught as a logical extension of diagonal stride as the basic rhythm of arms and legs is the same.

One effective method of teaching is by having the skier diagonal stride up increasing steepness, gradually increasing the Vee and introducing edging.



Once the basic movement is mastered, place emphasis on a quick complete weight shift, a powerful leg push, minimal Vee to cope with the slope and pole push behind the body



Safety Considerations Herringbone

Avoid icy conditions

Progression for Herringbone

- Diagonal Stride with increasing Vee
- Practice on steeper slopes
- Practice in softer ungroomed snow
- A half Herringbone can be used on cambered slopes or tracks

Drills:

Contest to see who can climb a hill with the least number of strides.

Common Problems and some Solutions in Herringbone

Error	Correction
Incomplete weight shift	Bend slightly forward relative to the slope but keep vertical to the “normal” and look up throughout the stride Apply more downward pressure (weight) on the ski
Incomplete arm action	Encourage “Rope Climbing” two ropes outside the skis
Incomplete leg action	Encourage “Marching” up the hill with complete action
Excessive foot lift	Brush the snow on the way up and through
Poor edging of skis	Drop the ankles and knees in (Knock Knee)
Tangling of the ski tails as they cross	Work on rhythm and ‘even’ action

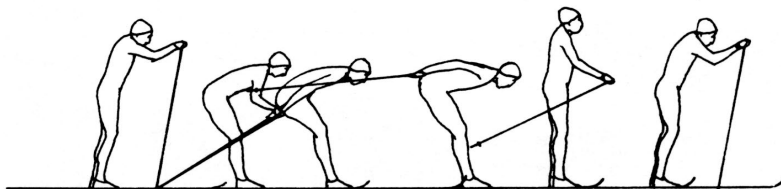
DOUBLE POLE

What is Double Pole

Double Poling is a higher gear than Diagonal Stride for moving across flat terrain or gentle downhill.

What are the Mechanics of Double Pole

Double poling uses synchronised arm swings enhanced by a bending of the torso. A compression of the upper body (an upright abdominal crunch or sit-up) engages the powerful torso muscles to boost the power generated by the arms. After poling though, the arms follow through at the end of the cycle. The poles end up parallel to the torso. It is a simple movement that is generally easier to master than the diagonal stride.



Why do we Teach Double Pole

Double poling is the next gear 'up' from diagonal stride. It provides greater lateral stability than diagonal stride because the feet remain side by side throughout the move. This surefooted position enables you to glide more comfortably across uneven terrain, particularly bumps and dips, uneven tracks and icy snow where balance is a problem.

Mastering the Double Pole is an essential building block for skating skills.

Where do we teach Double Pole

Double Poling is taught on flat, gently descending or very gently rising terrain. Set tracks are ideal but the skill should be also practiced out of track.

What Previous Experience is needed before attempting Double Pole

Before attempting double poling, it is essential that Introductory and survival skills are completed.

How do we Teach Double Pole

Double poling is taught in phases. Firstly, stationary coordinated movements of the arms, poles and trunk are done to establish the rhythm. Secondly, dynamic double poling is practiced. Finally, drills are conducted with individual error detection and correction.

Safety Considerations

Avoid steeper terrain and excess speed, at least initially.

Progression for Double Pole

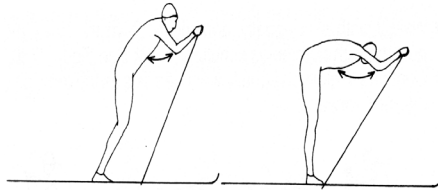
- Stationary practice of the rhythm of the action.
- Dynamic practice of the action with a single cycle - the preparation, execution and recovery phases.
- Dynamic practice of the action with multiple cycles
- Drills to establish rhythm.
- Games such as “least number of pushes” and relay races, especially for children.

Drills:

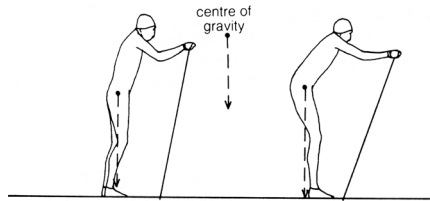
- Mimetic Drill, practicing the movement without planting poles. First, repetitions with eyes open, then with eyes closed. Have a partner check the drill from the side to ensure compression and arm extension.
- Synchronised pole drill with a partner.
- Point to point ‘number of actions’ drill.

Common Problems and some Solutions in Double Pole

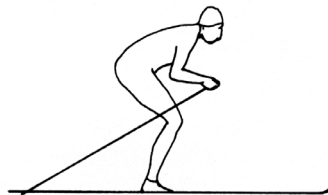
- Head dip error



- Centre of Gravity Error



- Squatting Error

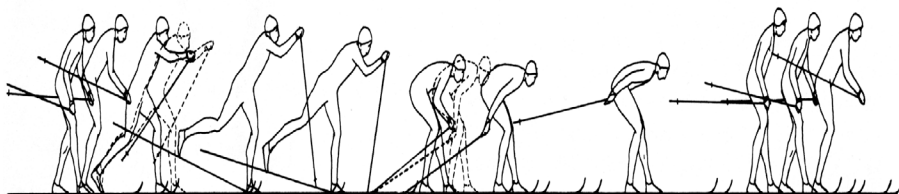


Error	Correction
The head drops during the pole plant (Head dip error)	Skier to look ahead and not bend at the neck
Poles lift excessively to the front before the plant	During recovery, let the pole tips drag until your hands return to shoulder level
Reaching out too far with straight arms before the pole plant	Bend elbows, keep arms closer to torso on initial plant
Poles angle forward instead of back at the pole plant	Control the flex on the wrists to ensure the pole is planted just in front of the binding
Lack of torso compression	Raise the torso upright until the hips move forward slightly, then bend it downwards brushing the hands through and past the calves
Hips remain behind the feet inhibiting momentum (Centre of Gravity Error)	Bring the hips forward in the upright position, removing wrinkles from the front of the clothing. Bend forward from the ankles and lean the body forward.
Legs bend excessively attempting to 'squat' and 'pump' during the sequence (Squatting error)	Stiffen and lock the knees in a slightly flexed position. Bend over without bending the knees

STRIDE DOUBLE POLE

What is Stride Double Pole

The Stride Double Pole is a gear in the classical technique used when the skier's speed is too great for effective Diagonal Stride and too slow for ordinary Double Poling.



What are the Mechanics of Stride Double Pole

The following are the basic mechanics of the technique:

- The action begins with a leg push phase similar to that in the diagonal stride (a quick flex and explosive extension).
- As the body moves up and forward over the glide leg, raise both arms to the front together in preparation for poling. The body's weight has now been shifted from the push leg to the glide leg as in the diagonal stride.
- When the former push leg reaches its highest position at the back, bring the arms and this leg down in a scissors-like action.
- Then plant the poles, and double-pole to push down the track.
- Return the arms forward much as in the free-glide phase of the double pole.
- In general, alternate push legs with each stride.

Why do we Teach Stride Double Pole

Stride Double Pole is taught to give more experienced skiers an effective in-between gear for use between Diagonal Stride and Double Pole.

Where do we Teach Stride Double Pole

Stride Double Pole is best taught on well set hard pack tracks on a slight uphill slope.

What Previous Experience is needed before attempting Stride Double Pole

The skier should have a good grasp of all classical skiing skills, in particular, a sound well balanced Double Pole technique.

How do we Teach Stride Double Pole

Stride Double Pole is taught by static demonstration and practice followed by dynamic demonstration and practice. The opening and closing using the static “scissor” drill is an effective way of developing the rhythm and timing of the Stride Double Pole technique.

Initially, there is no need to concentrate on the push part of the action until a firm grasp of the timing is gained.

As the skier becomes more efficient with the technique, the skier should practice striding on the left side and the right side. This can be done alternatively or after a set number of strides on each side.

Taking one ski off and doing the “scootering” drill is an effective way of highlighting the timing of the push leg and also the power required to drive forward. Swap skis and scooter on both sides.

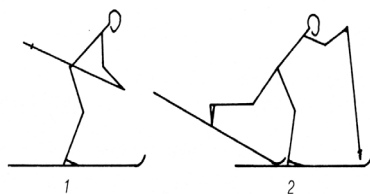
After practicing the scooter technique with one ski off, put the second ski on and then try scootering.

Safety Considerations Stride Double Pole

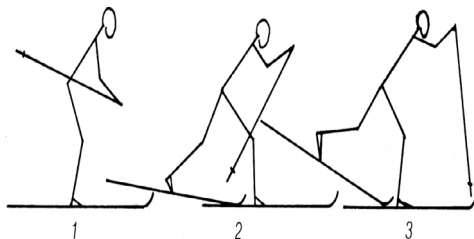
Avoid icy track and soft ungroomed snow.

Progression for Stride Double Pole

- Practice the scissor action of foot to the rear in time with preparing the poles for planting.
- Practice the scissor action in a stationary position but with repetition – correct errors.



- Attempt the action dynamically but do not concentrate on push or drive, just the timing.



- Attempt to get some push and drive - emphasize a powerful, complete double-poling action.
- Practice one footed - emphasize the pushing action of the leg and good weight shift, rather than a step – correct errors.
- Practice alternate feet – correct errors.

Drills:

- Try to see who can do the fewest stride double poles when covering a set distance; this drill works on maximizing power per stride.
- Try two strides on one leg the two on the other – mix up the strides.

Common Problems and Solutions in Stride Double Pole

The one-step double pole is very similar to a combination of the double-pole and diagonal-stride techniques. The errors and solutions pointed out for these techniques are in most cases equally applicable for the one-step double pole

STRAIGHT RUNNING

What is Straight Running

Straight Running is allowing the skis to run down an incline keeping them parallel whilst retaining a balanced stance. It is “coasting” in the skiing gearbox.

What are the Mechanics of Straight Running

- Solid but relaxed and balanced stance with flexed knees
- Hands to the front
- Weight evenly distributed on both skis
- Flat skis, shoulder width apart
- Glide down an incline

Why do we Teach Straight Running

Straight running is a technique for descending without propulsion without significant turns. It leads to techniques such as “race tuck” and Telemark Running.

Where do we Teach Straight Running

It is taught on a slight to medium incline

What Previous Experience is needed before attempting Straight Running

Introductory and Survival Skills are essential.

How do we Teach Straight Running

Straight Running is taught by demonstration and student practice. Various balance drills can be incorporated in the straight run such as weighting and un-weighting, shallow Telemark running, controlled squats, kneeling on one ski and progression to race tuck.

When cornering, a slight lead with the outside leg and a gentle weight transfer to that leg is beneficial. Steer with your hands through the bend.

Bumps and Dips can be incorporated, encouraging the skier to use their “shock absorbers” to raise the legs under the hips when going over a bump and extending them in a dip.

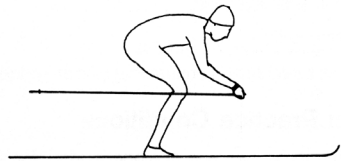
Safety Considerations Straight Running

If slowing and braking skills (snowplough) have not been covered, ensure a safe run-out is incorporated in terrain choice.

Progression for Straight Running

Stance – The Ready Position

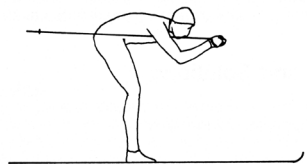
- Run down successively steeper inclines



- Incorporate levels of Tuck.



- Incorporate drills
- Incorporate bumps and dips



Drills

Gentle and rhythmic up and down (weighting and un-weighting) movements whilst straight running

From gentle and rhythmic weighting and unweighting of skis, practice stepping in and out of the tracks

Gradual encouragement to a half tuck and a race tuck

Practice shifting weight slightly forward and back and feel the change in speed.

Common Problems and some Solutions in Straight Running

Error	Correction
General instability	Check for even weighting of skis Check: Skis may be too close together Check: Skis may not be running “flat” Check: Boots may be loose Check: Stance may be too rigid
Rising on bump, dropping into dip	Walk through the sequence
Getting spat out of the bend	Emphasise leading with the outside leg Slight weight shift to the outside leg Steer the hands through the bend

THE SNOWPLOUGH

What is the Snowplough

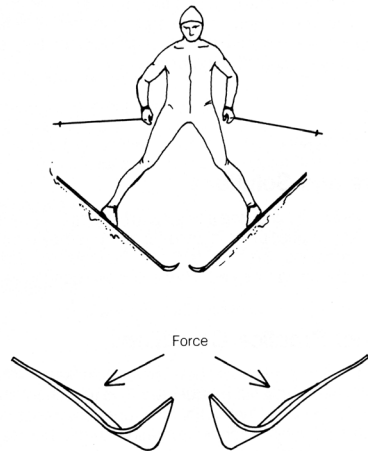
The Snowplough is a Vee shaped position made by the skis. The ski tips remain together (about 5 cm apart) whilst the distance between the tails varies according to how fast/slow the skier wishes to go. The skis are rolled onto the inside edge to also control braking effect.

(Note that a snowplough on Nordic track equipment is more difficult to control than on rigid alpine boots and wide metal edged skis. The soft nature of the boot and binding and narrowness of the skis requires more definitive foot and ankle muscle input and the knees must remain well flexed.)

What are the Mechanics of Snowplough

The mechanics of the Snowplough are broken down into three movements that are blended together to appear as one. The first movement is a pushing apart of the legs and skis and the second movement is a turning inwards of the legs (femur).

The third movement applies a “braking” force to the glide to enable you to come to a stop under control. You do this by applying downward pressure vertically over the skis by dropping the body.



These three movements have to be smoothly coordinated to produce a good snowplough. If one movement dominates the other, problems will occur.

Why do we Teach Snowplough

To control speed and be able to stop on most slopes
To learn the position to be able to progress to snowplough turns

Where do we Teach Snowplough

A gentle to medium slope (depending on snow conditions) is required to teach the snowplough

What Previous Experience is needed before attempting Snowplough

Introductory and Survival Skills are essential

How do we Teach Snowplough

- Review the angled 'brushing' action with one ski from Introductory Skills.
- Review the Stance.
- Whilst running down a gentle slope, encourage the skier to push the heels apart and roll the skis gently and evenly onto the inside edges.
- Maintain a good solid stance.
- A wider snowplough position slows you down more and a narrower position allows you to go faster.
- Down-weighting into the snowplough and up-weighting out of it enhances or reduces the braking effect.
- It is important that students view your demonstrations from the side, front and rear.
- Emphasize – well flexed knees, hand position, ankle roll and inside edging.

Safety Considerations Snowplough

Avoid soft deep snow and icy conditions, at least when teaching beginners.

Progression for Snowplough

- Stationary 'brushing' drills
- Stationary 'snowplough position' drill

- Commence a gentle run with skis parallel in correct stance
- Force the ankles outwards and roll the inside edges in.
- Progress to steeper slopes and faster entry speeds

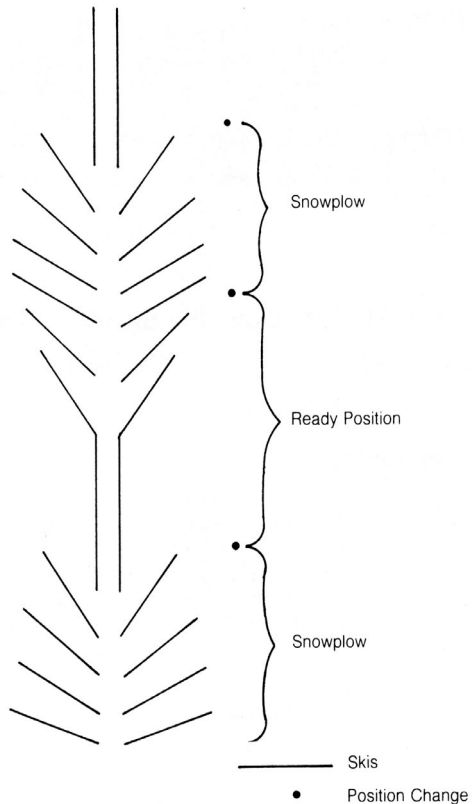
(Note: some beginner skiers will find even attempting a gentle downhill slope intimidating. A good tactic is to commence with a single foot snowplough with the other foot anchored firmly in the track. Once confidence in speed control is established, move to double foot snowplough.)

Drills:

Move from parallel into snowplough then into parallel again

Down-weight into the snowplough, up-weight out of it and repeat, increasing tempo

Snowplough glide to brake at a specific point (planted pole/flag/cone)



Common Problems and some Solutions in Snowplough

Error	Correction
Can't slow down	More flex at the knees More roll in at the ankles Push skis out to a wider Vee
Sitting back on skis so they can't slow down	Move hips and upper body forward
Erratic descent (not in a straight line)	Weight skis evenly Edge skis evenly
Crossing tips	Push heels out – not toes in More flex at the knees
Asymmetrical braking (favouring one leg)	Make the Vee symmetrical Body alignment should be square and facing the direction of travel Edge evenly on each ski
Tips too far apart	Reduce the gap between the skis to 5 cm Move hips and upper body forward
Knock knees	Keep the knees apart Imagine a balloon between the knees The movement has to come from the whole leg, not the lower leg

TURNS ON NORDIC SKIS

Generally speaking, there are three turns on Nordic skis that are necessary for dynamic manoeuvring on the snow.

The Step Turn is used when **speed is to be maintained** but not dynamically increased or decreased. It is handy for small changes of direction at speed or larger changes of direction over a longer radius. It does not, in its pure form, contain an edging element. Some speed gain will occur because of continued movement down the slope. A Step Turn often blends into a low-end skate turn due to a natural tendency to edge the ski.

The Snowplough Turn is used to turn smoothly and **control speed** in the turn. It is a very universal technique as it is infinitely tuneable to achieve changes in direction and speed control. It can easily be used as an entry point for a Christie, Stem Christie, or Telemark turn. It is an essential tool for beginners to progress skiing on varied terrain.

The Skate Turn is a very **dynamic accelerating turn** and can be described as a wide Step Turn with an explosive push-off in the new direction. Sharp corners can be negotiated with Skate Turns. Skate Turns can be performed without using poles or with dynamic double pole movements

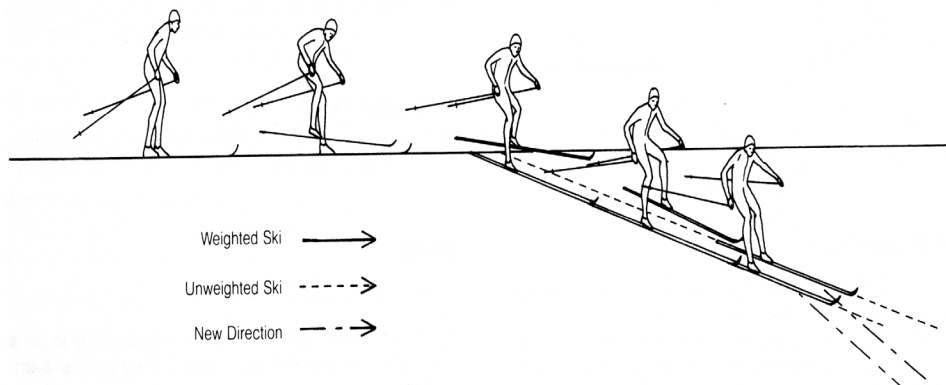
THE STEP TURN

What is the Step Turn

The Step Turn is a method of changing direction on the move where momentum is maintained.

What are the Mechanics of the Step Turn

The turn involves making a series of small, angled steps to the side whilst gliding forward. The faster the skier's speed, the faster and smaller the steps. The skier's weight is kept back on the heels.



Why do we Teach the Step Turn

To enable the skier to make non-accelerating changes of direction at speed. Step Turns can be used for getting in and out of a classic track.

Where do we Teach the Step Turn

On groomed snow with a downhill slope to begin with. Progress to soft deep loose snow for drills and thrills.

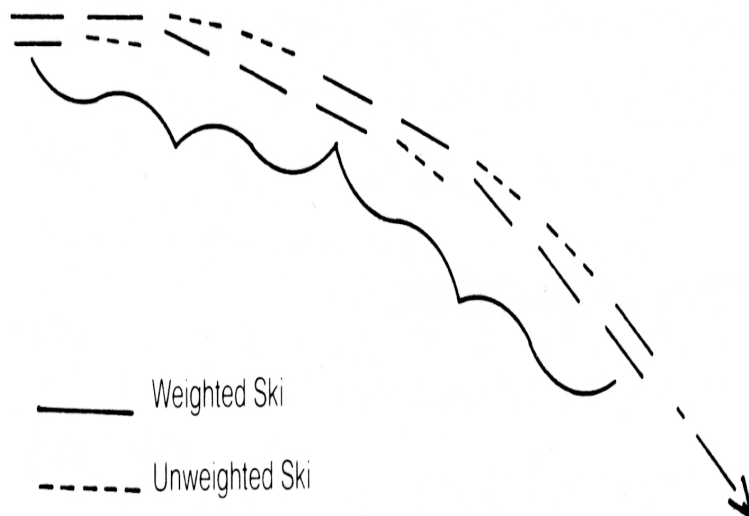
What Previous Experience is needed before attempting the Step Turn

Introductory/Survival Skills and Traversing are essential, Straight Running and Snowplough braking are desirable.

How do we Teach the Step Turn

- Review Stance.
- Review Star Turns, emphasizing ski tip lift and weight on the heels.
- Demonstrate with exaggeration of the weight back and strong tip lift into the new direction.
- Practise small changes of direction to the left and right down a gentle slope.
- Practise turning in one direction across the fall line to slow into the hill, then the other direction.
- Practise with increasing speed and slope steepness.

Safety Considerations the Step Turn



- Avoid icy slopes with beginners

- Initially choose terrain with run-out.

Progression for the Step Turn

- Static star turns with small fast movements to left and right
- Practise turning in one direction across the fall line to slow into the hill, then the other direction
- Small directional changes to both sides down a gentle slope
- Increase slope and length of run
- Practise in deeper soft snow
- Practise with obstacles, linking turns.

Drills:

- Practise star turns;
- Do balance drills on one leg;
- Practise in soft deep snow to emphasize weight shift and tip lift;
- Practise on a slalom course (flags, cones, poles);
- Increase tempo of steps to “pitter-patter” rhythm

Common Problems and some Solutions in the Step Turn

Error	Correction
Incomplete weight transfer	Practise balance on one ski Practise star turns in deep soft snow
Steps too big	Emphasise taking small steps with complete weight transfer from stepping to gliding ski Set up two lines between which a skier must do a given number of steps as they go downhill.
Stepping forward	Lift the tips as for the Star Turn

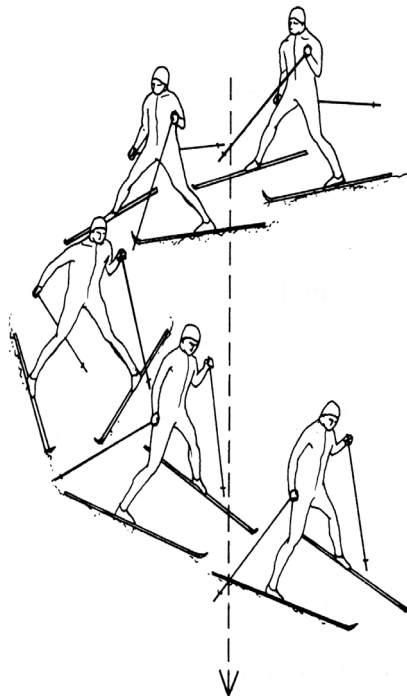
SNOWPLOUGH TURNS

What is the Snowplough Turn

The Snowplough Turn is a controlled balanced turn, used to change direction safely whilst on a downhill run

What are the Mechanics of the Snowplough Turn

The skier adopts the basic Snowplough position. To initiate a Left turn, the skier pivots the ski in the new direction by pushing the Right knee downward and to the centre, and pushing out on the heel, gradually increasing the pressure and weight on the Right ski. When the skier has turned as necessary, the skis are once again evenly weighted. In a Right turn, the opposite movements are used. Essentially differential pressure and therefore frictional forces are applied to the skis.



Why do we Teach the Snowplough Turn

Snowplough turns are taught to enable the skier to change direction under control whilst on a downhill run. It is a very universal technique as it is infinitely tuneable to achieve changes in direction with speed control. It can easily be used as an entry point for a Christie, Stem Christie, or Telemark turn. It is an essential tool for beginners to safely progress to skiing varied terrain.

Where do we Teach the Snowplough Turn

They are taught on Gentle, progressing to steeper terrain, down the Fall-line.

What Previous Experience is needed before attempting the Snowplough Turn

Introductory/Survival Skills, Straight Running and Snowplough braking are essential.

How do we Teach the Snowplough Turn

- Demonstration and practice
- Use 'tips and tricks' such as pressing turn buttons on the knees, steering the tractor, reaching down to touch the calf etc.

Safety Considerations the Snowplough Turn

Avoid icy conditions and heavy soft snow for beginners. If possible, use terrain with run-out.

Progression for the Snowplough Turn

- Allow the skier to become comfortable with the turning technique on gentle slopes.
- Once comfortable turning for initiation in either direction, link turns.
- Gradually lengthen the runs and increase steepness of terrain.

Drills:

As for the progression.

Use slalom drills through gates of cones/flags/poles.

Common Problems and some Solutions in the Snowplough Turn

Error	Correction
Poor body position resulting in insufficient turning action	Practise correct movements on the flat then progressively steeper terrain using good bend at the hip, knee and ankle – in and down toward the snow
Overturning	Stop unequal edging and pressure once the initial turning action occurs
Excessive upper body movement	Encourage the skier to relax throughout the turns. Retain the same upper body position relative to the legs, as in the normal snowplough
Falling	Keep legs relaxed, weight back, poles back. Revert to snowplough if necessary

Differential ski braking – The Crab

A variation on the Snowplough Turn that is also a great drill for learning differential edging is the Crab Snowplough.

On a wide groomed slope, the skier starts in a snowplough and then rocks the inside edges of the skis differentially so that one ski runs only on its edge but the other ploughs under control of the skier's weight and edging.

The effect is to travel sideways (the Zig) across the slope with the body facing directly down the hill.

The skier then rapidly changes edges and equally rapidly moves to the other tack, crabbing sideways again down the slope on the opposite tack (the Zag).

The effect of changing direction rapidly induces upsetting 'G' forces which can train the skier to overcome unbalancing effects and improve their inherent stability skills.

Essentially though, this exercise enhances the skier's fine motor control over the small muscles of the foot and ankle.

It is a good exercise for Beginner Plus to Intermediate Nordic skiers who are generally not used to strong edge control on their lightweight equipment. It is hard to stop young skiers doing it for fun.

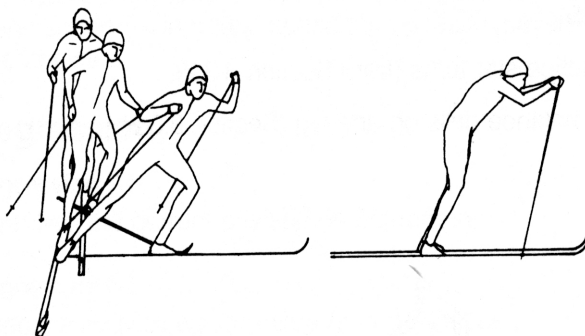
THE SKATE TURN

What is the Skate Turn

The skate turn is used to corner at relatively low speed. It is a dynamic turn that can incorporate acceleration due to the leg push off and double poling action

What are the Mechanics of the Skate Turn

- The skate Turn can be described as a wide step turn with an explosive push-off in the new direction.
- It begins with a double pole action and whilst returning to the upright position, the inside ski is lifted, and the arms and body moved quickly into the new direction.
- A strong inside edge on the outside ski is used to push the skier into the new direction with an explosive extension of the hip, knee and ankle. The weight is transferred to the inside ski and the outside ski is brought parallel.
- A new double poling action now takes place.
- Several cycles can follow.



Why do we Teach the Skate Turn

The Skate Turn is taught to enable the skier to turn sharp corners and maintain speed or even accelerate out of corners in a stable manner.

Where do we Teach the Skate Turn

The Skate Turn is taught on medium to sharp corners.

What Previous Experience is needed before attempting the Skate Turn

The skier needs to be comfortable on most terrain on skis and should have covered all the classical skills, in particular the step and snowplough turns.

How do we Teach the Skate Turn

- One of the ideal ways to introduce the Skate Turn is from the Marathon Skate. After a couple of cycles of Marathon skating out of the track, the gliding can be changed in its direction when unweighted and pushed explosively to the new direction with the edged skating ski.
- This should be practised to both sides.
- On flat terrain, practise skating in a figure of eight pattern, increasing speed and reducing the size of the figure of eight pattern.

Safety Considerations the Skate Turn

Avoid icy snow and off camber corners.

Progression for the Skate Turn

- Marathon Skate in the track.
- As the push ski is weighted, lift the tip of the gliding (in-track) ski then place it back down in the track.
- Marathon Skate out of track.
- As the push ski is weighted, lift the tip of the gliding ski then place it back down straight ahead.
- As the push ski is weighted, lift the tip of the gliding ski then place it down in the new direction then bring the push ski back parallel to it.
- Repeat, continuously changing direction away from the push ski.
- Maintain correct timing.
- Refine use of edges.

Drills:

- Practice on a groomed flat or slightly downhill corner going through the skill without poling.
- Practice both directions.
- Practice, introducing poling.
- Double Pole up to the corner, skate turn around it and return to two or three double pole actions after the corner.
- Try skate turning in soft snow
- Skate turn drill around two circles of cones/flags, completing sets of “figure of eights”.
- Decrease / increase the circle sizes and repeat.

Common Problems and some Solutions in the Skate Turn

Error	Correction
Ineffective use of hip, knee and ankle joints in the push results in incomplete weight transfer	Emphasize a powerful leg push by going back to Marathon Skate drills in the track
Reduced push power due to lack of flexion loading of the joints and muscles	As above – emphasizing flexion loading
Arms akimbo (flung out widely or haphazardly) and not driving in the new direction throwing weight transfer off.	Lead with the hands into the turn by bringing them into the new direction when returning forward from the double pole action
Steps too large	Practise with only small changes of direction

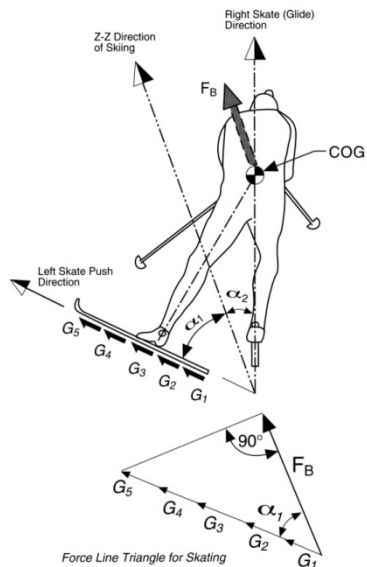
SKATING TECHNIQUES

Skating techniques enable the skier to move faster than if they use the traditional classic techniques. This increase in speed occurs because no grip wax or pattern base is used, thus reducing drag or friction of the ski during gliding, and because changes in the body's positioning allow the skier to generate propulsive forces against the snow for a longer period of time. Generally, Skating technique is demanding to both learn and teach as it requires the skier to maintain a rhythm and smoothness in their movements that maintains momentum. Maintenance of momentum is the secret to efficient easy skating

The Fundamental Mechanics of Skating

The basic leg action in all of the skating techniques is similar. The skier pushes off one ski, the “push ski”, which is edged, and transfers their weight to the other ski on which they balance and glide, the “glide ski”.

The glide ski is kept flat until speed starts to wash off at which time they edge that ski and transfer their weight to glide on the original push ski.



The movement of the trunk is similar throughout the technique. The skier flexes slightly at the waist during poling and it is the end of this downward movement of the trunk that signals the start of the weight transfer to the other ski. The trunk, together with the hips, move to be relatively perpendicular with the glide ski, positioning the torso over this ski.

The pole action, similar to Double Pole, should aim to have both poles pushing along the line of the driven gliding ski. Using this “best line of application of force” is a general principle and does vary a little with gear changes within the technique. Gliding on a flat ski, body weight centralised over the gliding ski, efficient poling angle and weight transfer during the skating cycle, are the keys to skating effectively.

Some Points to Remember

- There must be a complete weight transfer from ski to ski with the body lining up in the same direction as the new glide ski is pointed. Since the skier bends the push leg in preparation for the next push, when the upper body finishes its downward movement, the skier aligns the body over the new (non-edged) gliding ski. While realigning, they transfer all of their body weight to the new glide ski and their nose and navel and knee line up over the top of the foot.
- The glide ski, initially flat on the snow surface, is then edged as the ski slows in speed and the next leg push is initiated.
- The leg push is mainly out to the side as the gliding ski is directed forward.
- The skis are always moving across the snow – a stalled ski is difficult to get moving again.
- The skier should be "quick and light" on their feet with a good feel for the changes in snow and track conditions.
- As for diagonal stride, the leg joints are quickly flexed or “loaded” prior to the powerful extension of the hip, knee and ankle joints at the leg push.
- There should be equal push from both legs.
- The arm and trunk actions are quite similar to the double poling action.
- The skier should be relaxed, pushing hard with the legs and poles while at the same time taking advantage of the glide.

TEACHING SKATING

There are many pathways into teaching skating however once the skier has mastered the basic offset, the learning curve accelerates. The beginner skaters “bogey man” is the hill. Because beginners have not developed the rhythm to maintain momentum, hills sap their energy readily. Nothing discourages beginners more than running out of the energy to continue halfway through their lesson.

The solution is to ease the beginner skater into the technique on gentle terrain and make sure they get plenty of practise to embed the motor memory of the coordinated leg, body and arm movements of efficient and effective technique.

There may be argument over the best progression into skating skills but some general principles should apply:

- glide,
- weight transfer,
- edge push,
- pole push, and
- timing.

There are a number of approaches to teach skating. Free skating without poles and the associated exercises is a great way to develop balance, timing and the appropriate application of power from the legs. It also frees the skier to focus on the lower body without the encumbrance of having to time the poling action.

Marathon skating has the benefits of building on the previously learned skills of double poling along with the stability and directional control provided by the classical track. Marathon skating also isolates the push skate onto one side and focusses the skier on where power comes from through compression, edging and extension of the ski outside the track.

Another approach might be to start the progression with Double Time skating but the increased tempo required for this is mostly beyond the average beginner skier. As well, the typical Australian skier wants to get out and ski as soon as possible so initially arming them with a solid Offset Skate seems to be the preferred pathway.

The order of progressions in this part of the manual is therefore a guide. The skills are explained in isolation as they are the traditional “gears” of skating. Below is a suggested pathway to introduce skating.

The Australian skating terminology adopted by APSI is different to some other countries and indeed varies within the Australian skiing and racing fraternities. APSI Instructors should be familiar with the terminology and understand the other terms used internationally. A table is provided at the end of this manual to clarify the many different terms used.

A Suggested Beginner’s Pathway

The following progressions will give beginner skiers a good grounding in the fundamentals of the skating techniques:

Stage One

- Give an ‘end form’ demonstration of the leg action in skating without poles.
- Have the skiers on a slightly sloped downhill without their poles
- They then put all of their weight on one ski, gliding a short way down the hill before transferring their weight back onto the other ski.
- Concentrate on gliding on a flat ski when going down the hill.
- Focus on moving the hips and trunk over the gliding ski.

Stage Two

- On a flat area, mark two lines about 50 metres apart with dye, flags or cones.
- Have the students skate between the markers, trying to take as few skate steps as possible.
- They should count the number of skates it takes and use this as a base line for improvement.
- Have them practise edging the push ski when transferring their weight to the glide ski.
- Remind them to glide on a flat ski.
- Retest using the two markers.

Stage Three

- Have them work on a quick leg push coming from the rapid bending and then straightening of the hip, knee and ankle.
- Make sure they have their body well balanced on the glide leg. Their knee, navel and nose should line up over the glide ski with the line through the hips perpendicular to the ski.
- Get them to touch the ankle of the next glide leg to the ankle of the gliding leg just prior to push off.
- The skier should then place the new glide ski on the snow with the toes down, ensuring that there is a smooth transfer of weight to a flat ski.
- Retest using the two lines.

Stage Four

- Place some side limits on the skating area to encourage not skating too far to each side.
- The flatter the terrain and the faster the skier goes, the smaller an angle there should be between the skis (the Vee).
- Test proper Vee by timing the skier between 2 points using different Vee angles between the skis.
- Ensure that the skiers push and glide using both sides of their body equally well.

Drills

One set of drills involves moving clenched hands into the direction of the gliding ski.

- The skiers should skate in a high tuck position on a flat or slightly downhill track on which they can get good speed.
- They hold their hands clenched straight in front pretending that they are praying. When they push off their left ski the praying hands should be pointed in the direction that the right ski is travelling. Their hands should line up over top of the ski surface. They stay like this balanced on that ski until it slows at which time they quickly flex their right leg to begin the preliminary movement for the next leg push.

- They now swing the hands around again in front of the body and point them in the direction of travel of the left ski as they transfer their weight to this new gliding ski. Once again, the hands should line up over the ski.
- This drill can be completed with arms folded, Cossack style, pointing the relevant elbow in the direction of the gliding ski.

Another drill is to emulate a speed skating action with one arm behind the back and swinging the other arm. Alternatively, both arms can be swung in the same fashion as a speed ice skater. This drill is best done slightly uphill because skiers will generate high speed when they adopt a low position like a speed skater.

A good drill to encourage extension of the leg and longer glide is for the skier to bring the swinging arm up to the brow in a Military Salute. Alternatively place the hand on the forehead as if they are looking into the distance.

A drill to encourage strong leg push is to skate in a low position between two points. With the extra stability afforded by the low profile, a strong push is possible without overbalancing.

Have competitions between skiers to see who can take the fewest strides between 2 points and who can travel the quickest between 2 points.

Playing touch or snow soccer on skis is good for developing the balance and speed necessary in skating.

Place 4 chairs spaced out on the snow and have the skiers skate up to one, do one circle around the chair, sit down properly with ski tails tucked under the chair, get up, circle the chair again and ski to the next chair. This drill can be done on the flat, up a slight rise or down a gentle hill.

One interesting drill is to blindfold the skier and ask them to skate. By blindfolding the skier you heighten their awareness of touch and their feeling for balance and whether or not they are on a flat ski.

As skiers become more comfortable on their skis, have them try to skate backwards on the flat. Encourage them to lean forward or back and noting the difference their

body position makes. Relate this to body position when skating normally as an example of why skating is not effective when you lean back.

Practising in 3-5 centimetres of loose snow will encourage the development of a good weight transfer.

Practice on figure of eight or flat marked slalom courses.

A good drill for encouraging skiers to have a more forward hip position is to have them place both poles together and hold them under their buttocks as if they were sitting on the mid-section of both poles. The poles should remain parallel to the ground and the skier is encouraged to pull on both poles as means of forcing their hips forward while they are skating.

MARATHON SKATE

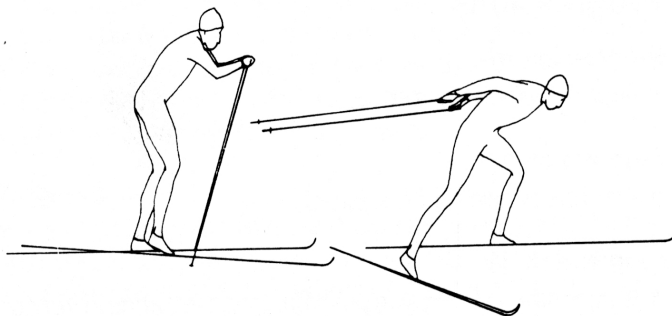
What is the Marathon Skate

The Marathon Skate can best be described as a one footed or one-sided skate. Another term for the Marathon Skate is the Half Skate. It is done by using a double poling action coordinated with the propulsion power of only one edged ski whilst the other ski glides.

It is used mainly on flat and slightly downhill sections of courses. It should only be used on hard packed well-set tracks. Marathon skate is a fourth skating gear.

What are the Mechanics of the Marathon Skate

- From a forward position similar to the start of the double pole, the arms are thrust downwards while at the same time one ski is pushing out to the side with a similar action similar to ice skating.
- The skier's weight is briefly transferred onto the push ski which is angled at approximately 30° to the track. The body is then pushed forward and to the side, back over the glide ski. The angle of push varies with the speed of the skier, i.e. the greater the speed, the smaller the angle.
- The push leg and arms reach their farthest backward position about the same time and then are returned forward. The push leg is returned so that the sole of the foot is brought towards the ankle of the glide foot.



Why do we Teach the Marathon Skate

The Marathon Skate is taught as a 'gear' within the skating technique that is used on flat and slightly downhill sections of set track. It can be used on classical skis. It is also a useful manner to introduce skating technique to beginner skaters as a first progression.

Where do we Teach Marathon Skate

The marathon skate should be taught and practised on a flat or slight uphill grade with hard packed, well-set tracks.

What Previous Experience is needed before attempting the Marathon Skate

Skiers should be comfortable and balanced on their skis having covered most, if not all the classical skiing progressions.

How do we Teach the Marathon Skate

The Marathon Skate is taught by Demonstration then student practice. The complete demonstration is followed by an explanation of the link to full skating, viz:

- A gliding ski with full body weight over it
- Timing of the pole push
- Correct Vee angle
- Flexion of the trunk and loading and unloading of the legs
- Strong edged action with the push ski
- Recovery to the feet together position
- A slight step forward for the next push stroke (max one x boot length)
- Student practice with error detection and correction

Safety Considerations

Avoid steep terrain and icy track

Progression for the Marathon Skate

- Have the skiers stand without poles and with the left ski in the right-hand track.
- The skier should balance on the left ski and then push with the right leg to the side. This action should be like scraping some snow away with the sole of the boot.
- When the leg is returned, the sole of the boot should be moved toward the ankle of the glide leg.
- As the skier becomes comfortable with the scraping action, have them dig the edge of the ski into the snow and push themselves down the track like a scooter.
- Practise with both legs and emphasize the rapid weight shift onto and off the push leg.
- Incorporate the poling action.
- Emphasize a smooth quick action.
- Practise both sides

Drills:

- Marathon Skate to both sides to ensure the skier is comfortable with skating to both sides.
- Try three short skating movements followed by balance and glide on the glide ski for as long as possible.
- Swap the gliding ski from track to track.

Common Problems and some Solutions in Marathon Skate

Error	Correction
<p>Poling Errors. In the pole movement, trunk, shoulders and arms are used. Failure to use all of these results in lack of power. (note: Trunk bend depends on forward speed)</p>	<p>Check that preliminary movements occur Emphasize a strong double poling action from the arms and trunk Have the skier practice the correct action while stationary and then under slow and full speed conditions Emphasize a powerful poling thrust</p>
<p>The push leg. The push leg must use the hip, knee and ankle for thrust, otherwise a lack of power will result.</p>	<p>Check to see that the preliminary movements have occurred Have the skier practice the correct action while stationary and then at slow and full speed Emphasize a quick sideways push</p>
<p>Pole thrust. The poling action should begin with a bending at the waist followed by a push off with the shoulders and then an extension at the elbows. Lack of proper sequencing will result in a lack of power in the poling thrust</p>	<p>Check for the correct preliminary movements Have the skier practice the proper sequencing from a stationary position and then at slow and full speed.</p>
<p>If the skier is not in the initial position to commence the action, the correct thrust will not be obtained.</p>	<p>Encourage a good bend at the hip, knee and elbow at the beginning of the marathon skate.</p>

Error	Correction
If the centre of gravity is too far back or to the side the effectiveness of the technique will be reduced. This can be caused by a slow, kicking action or the lack of a quick weight transfer to the push ski.	Encourage the skier to stay forward on the glide ski Encourage the skier to keep his or her body weight on the glide ski except for a brief rapid transfer onto the push ski at the beginning the leg push Encourage the skier to return the instep of the boot on the push leg to the ankle of the glide ski at the end of the push.

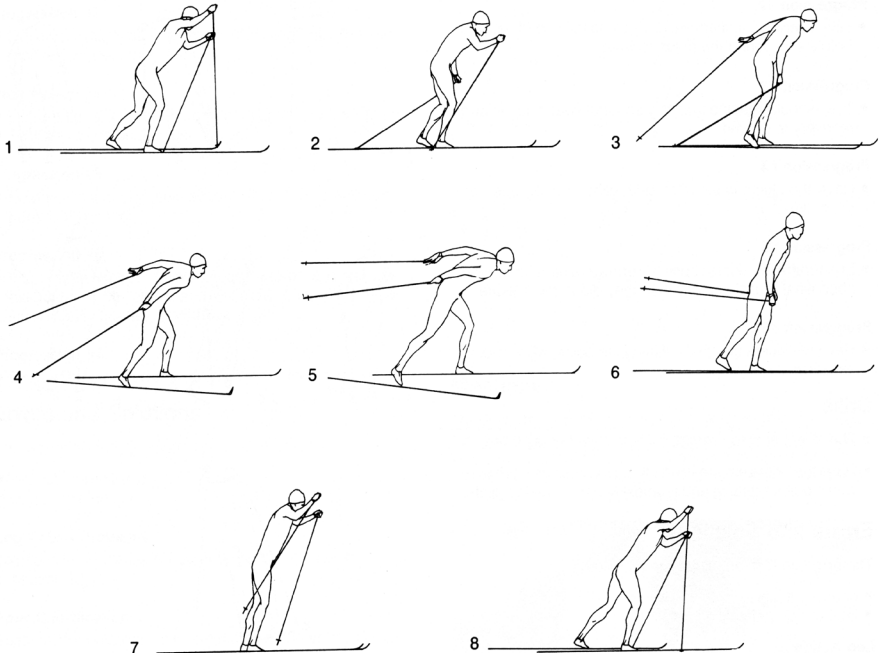
OFFSET SKATE

What is the Offset Skate

The Offset Skate, commonly called Offset, can be used on most terrain, but mainly gradual to steep uphill and is sometimes characterized as the diagonal stride of Free Technique skiing. Offset is the second skating gear.

What are the Mechanics of the Offset Skate

- Offset Skating is single sided skating (one pole push for each alternate skate) and is completed with an action in the arms that is offset to the ultimate direction of travel.



- The side that the skier is gliding on when the poles are planted is often referred to as the "strong side" and the other side is known as the "weak side" although this does not indicate that the push is stronger on one side than the other, just that one side has the extra force input of pole push.
- The poles are planted just as the glide ski is placed on the snow. The poles are planted at the same time but in a slightly staggered position. The weak side pole is planted around the foot with a similar arm position to that used in a double poling action. The strong side pole is planted slightly forward of the foot with the arm in a strong flexed position. The poling forces are directed back in line parallel to the gliding ski.
- As well as moving forward as a result of a good push and glide the skier steps forward and inward up the hill when placing the new glide leg on the snow. This is especially important on steeper slopes. The skier thus covers more distance with each stride and it is also a necessary preliminary movement for gaining maximum glide on a flat ski.
- As the slopes get steeper the skier's feet will come in under the body less and less due to the shortened glide time.

Why do we Teach the Offset Skate

Offset Skate is taught as a low gear of skating. It has a wide range of application to terrain from slight rises to steep hills.

Where do we Teach the Offset Skate

Offset Skate is taught on slight rises to steep hills

What Previous Experience is needed before attempting the Offset Skate

Offset Skate can be taught as an extension of Marathon Skate or free-skating without poles. Regardless, skiers should be comfortable and balanced on their skis and should have ideally been taught all classical skiing skills.

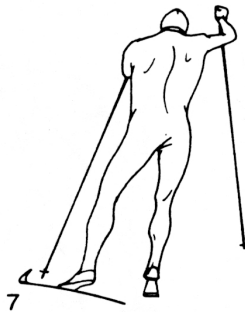
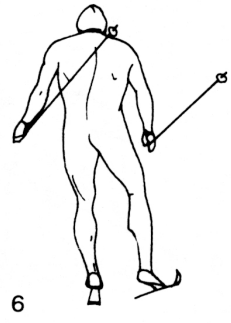
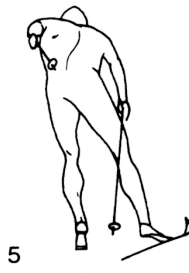
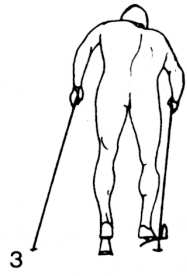
How do we Teach the Offset Skate

The Offset Skate is taught by Demonstration then student practice.

The complete demonstration is followed by an explanation of the mechanics viz:

- A gliding ski with full body weight over it
- Line of hips, navel and knee over the gliding ski
- Three points of contact on the snow at once – two poles and one ski
- Vee angle appropriate to terrain
- Flexion of the trunk and loading and unloading of the legs
- Strong edged action with the skis
- Bring the feet back under the body
- Step up the hill with each skate – thinking bringing the inner ankle bone or instep forwards in inwards
- Student practice with error detection and correction

(Note: In weaker or beginner skiers and on steep uphill there will be an offsetting in the leg action. The skier will not have time to get a powerful push from the weak side ski. They should at least attempt to get a good push from the ankle joint in this situation. As the skier becomes stronger they should try to get a good push from each leg.)



Safety Considerations the Offset Skate

Avoid icy track soft unpacked snow and steep slopes. Be aware that learning this technique can fatigue beginners or older skiers quickly.

Progression for the Offset Skate

- Practise the arm position at pole plant while first standing still and then at slow speed on the flats while double poling.
- Move to a steep hill with no glide (they can even take their skis off). Review the arm position at pole plant. Have the skiers walk up the hill, no glide, planting their poles and placing one foot down on the snow all at the same time. A convenient staircase can be used for this without skis as well.
- This drill is done first at slow speed. Then increase the speed once the correct arm action is in place and students are comfortable with the timing.
- Emphasise the weight shift. As the skiers plant their poles remind them not to shift their weight until the downward movement of their trunk is complete.
- Then shift body weight to the other ski with the trunk and hips moving across.
- On a less steep slope emphasize keeping the skis moving. Encourage the skiers to retain a flat ski during the glide.
- Skiers place their glide ski on the snow quite far in front of the former glide leg. In this way the skier covers a lot of distance up the hill with each stride.
- The final progression is to emphasize the proper leg push action.

Drills:

- Practise the basic mechanics of the technique in slow motion and then on a gradual uphill.
- Make a long line of dye up a medium slope and have the skiers Offset up the line ensuring they step their heels onto the line with every skate. Progress to stepping up and to the wrong side of the line with each skate step.
- Practise offset up a medium hill first with the strong side pole, then the weak side pole. Skiers learn a lot about the differential power they might be applying to each pole. They can also examine the point of plant, angle of plant and direction of push of the poles one at a time.

Common Problems and some Solutions in the Offset Skate

Error	Correction
Edging skis in glide	Have the skier lift their new glide ski well forward up the hill as they push off with their other leg. This will allow them to glide on a flat ski
Weak arm push	Check the previous sections for further arm related corrections. Get them to use their abdominal muscles in the poling action. The poles and trunk should be brought down in one continuous motion
"Bogging down" The skis slow to a stop between leg pushes	Encourage the skiers to stay "quick and light" Tell the skiers to stay upright while doing the Offset working more on a quick transfer of weight from ski to ski than on a really powerful arm thrust. Have the skier concentrating on the offset action of the arms so that they are always pushing with a pole or a ski. Make sure the skiers bring their new glide foot to the ankle of the old glide foot, just prior to push off on easy to moderate slopes.

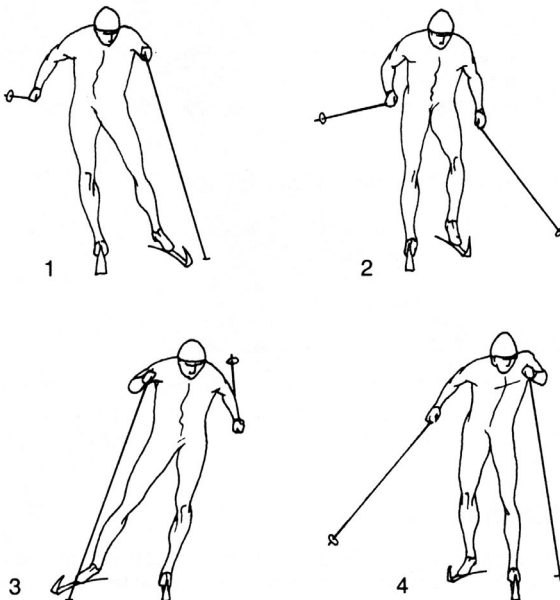
HERRINGBONE SKATE

What is the Herringbone Skate

The Herringbone Skate is a technique that can be used for climbing very steep slopes and in other places the skier cannot maintain momentum using the offset technique. Herringbone is the first skating gear.

What are the Mechanics of the Herringbone Skate

The technique is similar to that used in the classical Herringbone. One ski glides out to the side as the skier pushes off the opposite ski and propels their upper body up the hill with a pole push on the non-gliding side. The skier alternates arms and legs as in the herringbone technique. As with the other skating techniques the skier glides



on a flat ski. There is also more shoulder involvement in the technique than there is in the other techniques.

Why do we Teach the Herringbone Skate

The Herringbone Skate is taught as the lowest skating gear. It is useful for climbing very steep slopes, when the skier is tired and in other places where the skier cannot maintain momentum using the offset technique.

Where do we Teach the Herringbone Skate

Offset Skate is taught on slight rises to steep hills

What Previous Experience is needed before attempting the Herringbone Skate

Offset Skate can be taught as an extension of Classical Herringbone or from offset skating. Regardless, skiers should be comfortable and balanced on their skis and should have ideally been taught all classical skiing skills

How do we Teach the Herringbone Skate

Demonstration and practice.

Safety Considerations the Herringbone Skate

Avoid icy slopes, at least initially.

Progression for the Herringbone Skate

- Commence with classical herringbone
- Introduce a change to body position
- Encourage glide on each step
- Encourage strong glide
- Encourage rhythm

- Emphasize a strong arm push bringing the hands in front of the body and fully extending the arms behind.

Drills:

Mark off a segment of the hill and count the number of skates it takes to get up the hill. Also count the time it takes to ski the distance.

Try small high tempo steps then strong long bigger stepping steps – have skiers find a happy medium for themselves on a hill.

Practise breaking from Offset to Herringbone Skate and back again.

Common Problems and some Solutions in the Herringbone Skate

Error	Correction
The errors in the basic skating action and the Offset are also applicable for the diagonal skate	Have the skier bring their hands in front of the body to the midline (preliminary position) and then push out and back in a strong-arm extension

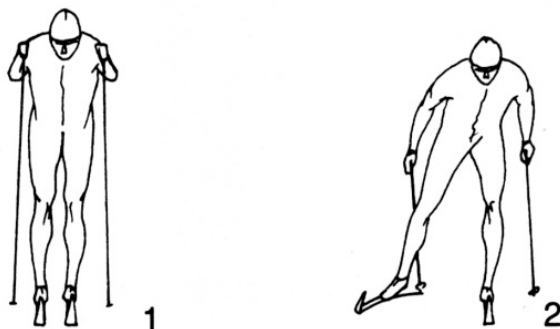
DOUBLE TIME

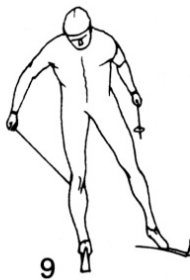
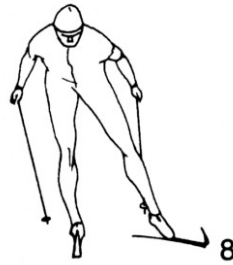
What is Double Time Skating

Double Time is a dynamic accelerating gear in the skating technique that is used on flat terrain and gradual uphill. It is a very effective technique if a skier is able to balance well in which case it can be used for longer periods as a rhythmic resting skate action. Double Time is the third skating gear.

What are the Mechanics of Double Time

Double Time skating leg action is even and presents a narrower Vee than offset or herringbone skating. With each leg push there is an accompanying push with the arms and poles. The arms should pull down and back pushing well behind the body. The arm and trunk action is similar to that found in a strong double poling sequence; although the trunk contributes to a much lesser extent than in normal double poling. The arms are recovered quickly to the preliminary position while the skier balances on the glide ski. Long glide phases are possible due to the narrow Vee and power of the pole-skate cycle.





Why do we Teach Double Time

Double Time is taught as an accelerating gear, above Offset but below Single Time. It can also be used on the flat as a long restful and rhythmic skating action.

Where do we Teach Double Time

Double Time is taught on the flat and gentle rising terrain.

What Previous Experience is needed before attempting Double Time

Skiers should be comfortable and balanced on their skis having covered most, if not all the classical skiing progressions, especially a sound double pole technique. There is some argument as to whether this should be the first skating technique taught, at least on the flat, to ensure skiers do not develop a “sided” bias that can be inherent in Offset Skating. The tempo of this technique can make this difficult as an introduction to skating.

How do we Teach Double Time

- Demonstration and practice.
- Have the skiers try Double Time in slow motion emphasising the glide and finishing the arm and leg pushes at the same time.
- Get them to try it at full speed emphasising a quick forward recovery of the arms.
- Instruct the skiers to concentrate on gliding on a flat ski.
- Practice increasing glide
- Emphasize a double pole action with the arms and some trunk involvement.
- Instruct the skiers to follow through well behind with a full extension at the elbow and shoulder joints. The hands should pass the legs about mid-thigh (with beginners, full follow through may not be possible at first due to the requirement to maintain tempo).
- Emphasize a powerful quick initiation of the poling action.

Safety Considerations Double Time

Avoid icy surfaces when teaching progressions.

Progression for Double Time

- Commence with Double poling
- Introduce lifting alternate skis with each pole push
- Introduce a small Vee when each ski is placed down
- Encourage a “whippy” return of the poles to the start position
- Encourage glide on each step
- Encourage strong glide
- Encourage rhythm
- Emphasize a strong-arm push bringing the hands in front of the body and fully extending the arms behind.
- Work on driving the ski that is to glide forward about one third to halfway through the pole push

Drills:

- There is no better drill for Double time than to do it over extended gentle rises
- Sprint start acceleration drills

Common Problems and some Solutions in Double Time

Error	Correction
Leg action problems	Ensure the skier gets full weight transfer
Poor coordination	<p>Have the skier first practise the skill in slow motion</p> <p>Make sure the skiers do not use the trunk too much in the action. There is not time between arm pushes to extensively use the muscles of the trunk.</p> <p>Use balance drills if the skier is unable to balance long enough on the glide ski for an arm recovery and push to occur.</p>

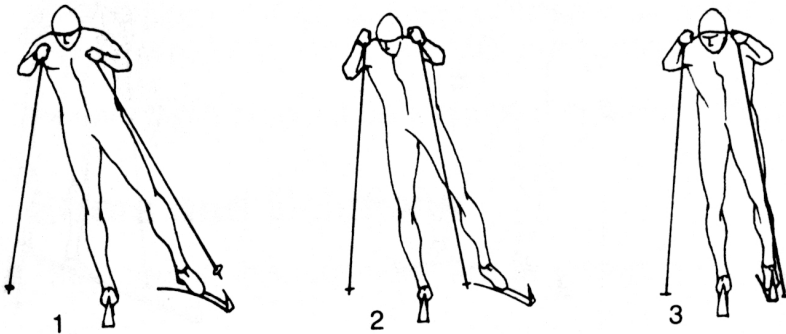
SINGLE TIME

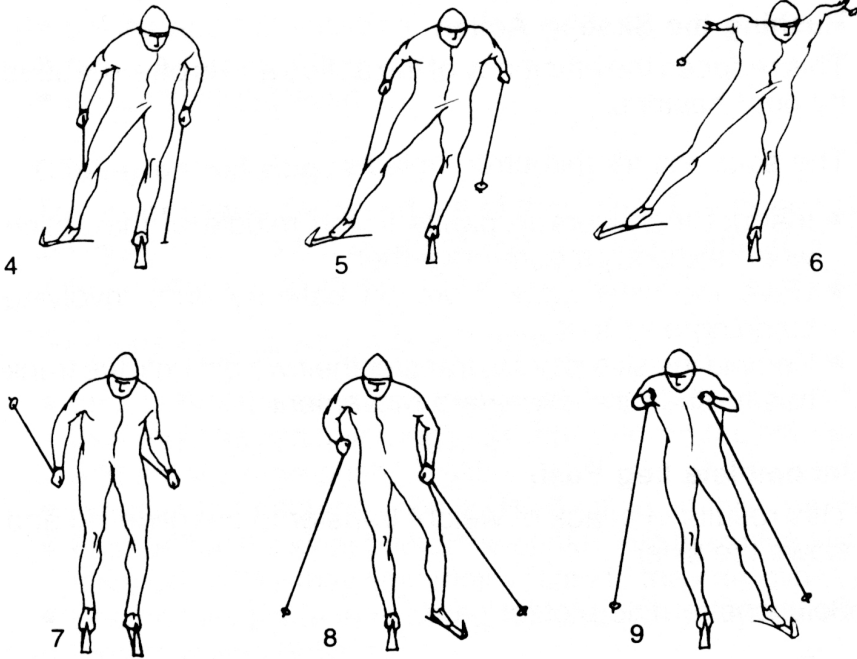
What is Single Time Skating

Single Time Skating is used on gradual downhills and fast flat sections when the skier is going too fast to pole every stride. It can also be used for moderate uphill. It is the top gear of pole pushed skating. Single time is the fourth skating gear.

What are the Mechanics of Single Time

Single Time is different from the Double Time as the name suggests in that there is a double poling arm action only with every second leg push. This allows a more complete arm push to occur, one that utilizes the abdominal muscles to a greater extent. The push begins mid-way through the glide on one ski.





Why do we Teach Single Time

It is taught as the gear that can be used when the skiers speed is too high to pole on every skate as in Double Time.

Where do we Teach Single Time

Single Time is taught on the flat or on very gently rising or falling terrain.

What Previous Experience is needed before attempting Single Time

Skiers should be comfortable and balanced on their skis having covered most, if not all the classical skiing progressions. Most if not all of the skating progressions should have been covered as well.

How do we Teach Single Time

- Demonstration and Practice
- Error detection and correction

Safety Considerations Single Time

Avoid icy surfaces.

Progression for Single Time

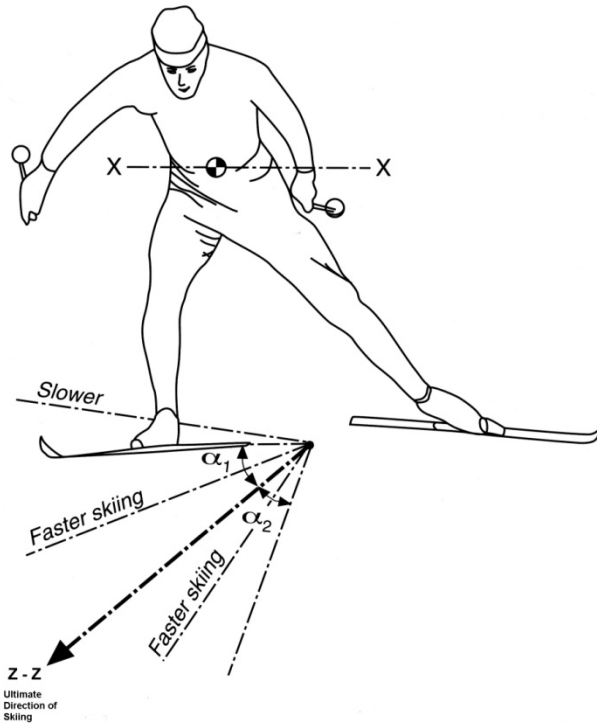
- Commence with revision of Double Time
- Have the skiers leave out each alternate pole action, recovering the poles slowly and after a pause to the rear
- Work with equal glide and leg push on each ski.
- Encourage the skiers to use the arms and particularly the abdominal muscles more than they did in Double Time.
- Have the skiers practise initiating the poling while gliding on either ski to avoid “sided” bias.

Drills:

- Practise the progressions as listed.
- Have the skiers emphasize a strong leg push on each side with a quick bending and then extension of the leg joints.

Common Problems and some Solutions in Single Time

Error	Correction
Poor leg action	The leg action should be similar to the basic action presented for Double Time
Lack of trunk effectiveness The skier doesn't use the trunk effectively	Instruct them to complete a full double poling action with each stride Remind them of the side to side (not rotational!) action of the trunk



Cross Country Downhill Techniques (XCD) or Alpine (and Telemark) Turns on Cross Country Skis

Given the characteristics of the typical Nordic track ski (no side cut and about 44mm wide throughout its length) the turning characteristics and therefore one's approach to teaching Cross Country Downhill Techniques (XCD) may differ then teaching someone on a parabolic alpine ski with rigid alpine boots and metal edged skis.

An approach that has been found to work well is to teach XCD from the premise that turns should be always linked and teaching using a garland, (a garland is an uphill single turn, using the slope to control the speed and stop the skier as they finish the turn) may be helpful, as it encourages a static body position and emphasises the traverse rather than the actual turning motion.

Maximum participation of the guest(s) is the key instructional method to enable as much practise as possible. Guests will not get feedback on every run but given some tools for self analysis between sets of runs, progression on the skills will be satisfactory.

When teaching XCD on Nordic track equipment we need to exaggerate pressure, rotary movements and edging motions to get the ski to slide or edge in a manner closer to the action of a soft flat alpine ski. In teaching we will emphasise definitive foot and ankle muscle input and the importance of well flexed knees. The "three angles" concept of the athletic stance introduced earlier in this manual is relevant for all XCD techniques.

THE BASIC CHRISTIE

What is a Basic Christie?

“A basic Christie is a snow plough turn with a matching of the inside ski at the end of the turn” APSI (2012)

What are the Mechanics of a Basic Christie?

Begin the turn by stemming the uphill ski outward and applying pressure onto that ski until the skis have passed through the fall line. Once skis have passed through the fall line bring skis into parallel.

Why teach a Basic Christie?

- Allows the skier to turn quickly and more comfortably on steeper terrain.
- The basic Christie is a more comfortable turn than a snow plough for most skiers
- A basic Christie allows the skier to avoid the acceleration that occurs in the first part of the parallel turn (Parker 2001).
- Useful when carrying a pack or the snow is too chopped up to snow plough
- A useful technique to descend moderate to steep slopes.(Parker, 2001)

Where do we teach the Basic Christie

Slight downhill, on soft to firm cover.

What Previous Experience is needed before attempting the Basic Christie?

Ability to complete several linked snow plough turns

Key points when teaching a Basic Christie

Review and practice linked snow ploughs

- Review snow plough turns. The snow ploughs are to be **linked**.
Avoid garlands!

- Emphasise weight shifting. To emphasise this you may need to talk about compression and sinking onto the outside ski of the snow plough
- Emphasise foot steering
- Review athletic stance
 - Flexed ankles
 - Bent knees
 - Arms forward at the tea tray position
- Now that you have good linked snow ploughs occurring, demonstrate this concept of sliding (stemming) the downhill ski across the slope whilst in a static position
- Again emphasising small, linked turns down the fall line, have your guests ski down a slight slope.

Linked basic Christie turns

The starting position should be in a parallel traverse position.

- Skier stems out the outward ski (to be downhill ski).
- Down weights the ski (sinks onto it)
- Using foot steering to drive the ski around past the fall line
- As the turn is finishing skier stands up slightly, bringing the inside ski into parallel with outside ski
- Repeat process for next turn, keeping the traverse to a minimum. As the guest gains more confidence shorten the traverse.

Progressions for the basic Christie

- At some point you will need to address keeping the upper body quiet, with the shoulders pointing directly down the fall line.
- It is best to leave pole planting out of the picture at this stage. The best use of the pole would be to hold them across one's body (imitating the famous tea tray) so each skier can get instant feedback if they are using their shoulders to turn their skis
- A useful drill for rhythm and un-weighting is the "bend down, throw a ball of snow, kick the cat" (one ski lifted into the air sideways), duck under the bridge (using 3 poles to form a bridge, 2 for uprights and 1 for the

horizontal) and lastly jump over a stock lying on the snow across the path of the skier.

Common Basic Christie problems and solutions

Errors	Solutions
Inside ski set on edge	Roll inside knee up the hill (inwards) as this will cause ski to flatten
Outside ski not turning	Look at foot steering
Ski tips crossing	Not enough ankle flex, so as to put weight onto ball of foot.
Skier not compressing outside ski (pressure)	Sculpt the skier's body at top of run, so as to develop muscle memory. Have the guest line up their nose, knee and toe on the outside ski
Upper body rotation	Go back to holding a tea tray, truck steering wheel. Dump the poles Have the skier look down the fall line at where they want to go Stand at the bottom of the run and hold out so many fingers. The guest to look at you and tell you how many fingers you are holding up

STEM CHRISTIE

What is a Stem Christie?

The stem Christie is a basic Christie an earlier matching of the inside ski. The matching of the skis occurs at or before the fall line. Typically, the turn may require more speed.

What are the Mechanics of the Stem Christie

Begin the turn by stemming the uphill ski outward and applying pressure onto that ski using foot steering to drive the ski around into the fall line. Before crossing the fall line the inside ski is brought into parallel and the two skis are skied through the fall line in parallel. More speed is required then a basic Christie.

Why do we teach a Stem Christie?

- It is a stepping stone to the parallel turn. In using classic or skating skis this is a very important progression. See foot note at end of the Stem Christie section.
- The turn allows the skier to turn more quickly.
- A useful technique to descend moderate to steep slopes.

Where do we teach the Stem Christie

Slight downhill, on a soft to firm cover.

What previous experience is needed before attempting the Stem Christie?

Able to do linked snow ploughs and Basic Christies. Able to do a snow plough brake and glide.

How do we teach the Stem Christie?

Again it is essential to teach this turn using the linked turn approach on a slight terrain so that every guest feels comfortable skiing directly down the fall line. No garlands.

For best results for the guest it is best to build directly upon the Basic Christie to the Stem Christies in the same session.

Progression for the Stem Christie

- Skier starts in a slight snow plough (wedge) across the fall line
- Skier needs to be in a downhill stance with ankles flexed and knees forward
- Allow the skis to run, skier un weights skiers before the fall line and brings the inside ski in to parallel.
- As skis are matched together skier sinks back into the athletic stance anticipating the next turn.
- It is best to leave pole planting out of the picture at this stage. The best use of the pole would be to hold them across one's body (imitating the famous tea tray) so each skier can get instant feedback if they are using their shoulders to turn their skis.

Common Stem Christie Problems and their solutions

Error	Correction
Inside ski set on edge	Roll inside knee up the hill (inwards) as this will cause ski to flatten
Outside ski not turning	Look at foot steering.
Ski tips crossing	Not enough ankle flex, so as to put weight onto the ball of foot
Skier not compressing outside ski (pressure)	Sculpt the skier's body at top of run, so as to develop muscle memory. Have the guest line up their nose, knee and toe on the outside ski
Not matching the skis early enough	Work on balance on the outside ski

Error	Correction
	Have them lift the inside ski into place rather than sliding into place More speed
Not weighting and un-weighting the skis	Ski down in front of the guest and have them model you. Speak out “down” “up” or compress uncompress, gorilla giraffe, whatever words works for you and your guest. Do a stationary body positioning with skis on , being on the outside ski.

The reality of using Nordic skis to make a turn

- With the use of classic and skating skis most skiers will not get past a Stem Christie. The reason being is that classic and skating skis with no side cut and lack of metal edges prohibit the skis from carving a pure parallel turn.
- Upper body need to be quiet and facing down the fall line at all times. The shoulders should not follow the skis.

Transitioning from a Stem to a Parallel.

It really is all a matter of degrees. However, these transitions from a stem to a basic parallel are important steps for Nordic skiers to move through as each construct crucial stepping stones towards performing a good parallel turn. Trundle (1993, p.46) describes this transition well when he states

“Inexperienced skiers will skid throughout the turn until they build up courage for a new turn. For experienced skiers the skis will come together and carve as soon as the skier begins to leave the fall-line (traversing begins). Expert skiers will begin to bring their skis together *before* they hit the fall-line, and carve or slip right through it and beyond, rarely allowing the skis to be in a stemmed position.”

So this brings us to the basic parallel turn.

BASIC PARALLEL TURNS

What is a basic parallel turn?

“It is a turn where the skis remain parallel from the start to the finish of the turn”.
(APSI 2012)

What are the mechanics of the Basic Parallel Turn

More speed is required than the stem Christie. Secondly, the skis have to be flattened by standing taller and taking out any stemming. Finally they are turned simultaneously rather than one followed by the other. APSI (2012)

Why do we teach parallel turns?

It is easier on the leg muscles than stemming.
A parallel turn is faster turn and gives more flexibility and mobility in the choice of skiing terrain.

Where do we teach the basic parallel

Slight downhill, on a soft to firm cover. The slope and snow conditions should allow for increasing downhill running speed.

What Previous Experience is needed before attempting the basic parallel?

Able to do linked Stem Christies

How do you teach basic parallel turns?

Again with this method the key to success is to teach basic Christies, Stem Christies and parallel turns in one session. This will maximise your guest’s success. Each turn is building on the previous knowledge and is constructing the knowledge to make a parallel turn.

If this is not the case, you will need to review with your guest basic Christies and Stem Christies before going any further. Assuming you have done this lets continue.

The ability to sink down and spring up is important (un-weighting the skis), but especially so is the ability to drive the knees downwards and inwards as the sinking takes place. Focus on the amount of pressure that can be applied through each foot, especially the 'outside' foot of each step across.

Drills

- On a long, even slope, descend directly and review step turning - briefly. To add a bit of variety, practise stepping the skis parallel to each other and as far as one can comfortably step sideways. Gradually build up the tempo until the stepping becomes a fast '*cha-cha*', rather than a '*plop...plop*'.
- Having completed the previous exercise, return to a flat area and repeat the same exercise, demonstrating that if the stepping is fast, angulation of the skier takes place, and edging of the skis also. It is this edging and angulation that will cause the skis to carve, if enough pressure is applied. Emphasise springing up between each step across, and sinking deeply at the culmination of each step. (Trundle, 1993, p66.)
- Rhythm: Working on sinking into the turn. Inhale deeply when standing tall in the skis to un-weight the ski. Exhale as you sink into the turn. Exaggerate the extension in the drill, meaning being tall and flexion (being small). Parker (2001)
- Side slipping. Have the guest practice side slipping, getting the feel of releasing edges and grabbing edges. Rolling knees up the hill to edge and stall then flattening skis relative to the slope to slip sideways down the fall line again.
- Traverse on a steeper slope (firm snow) with good edge grip through ankle, knee and hip angulation. Discuss edge and angulation. Traverse and side slip combination, again working on feeling the edges and angulation.
- Foot steering. Standing in the athletic position. Placing and holding a pole between you parallel skis, now lift up one ski and hold it across your ski on the ground. Pivot the up lifted ski against your pole. The guest should feel

pressure on the inside of the upper thigh muscle. This pressure is what should be felt when foot steering.

- Leg steering. This is a stronger and more accurate description of the above, however for the beginner skier the concept of foot steering is an easier concept to grasp and to visualise. With a more advanced skier it is worth discussing this concept of leg steering further. See chapter 5 of the APSI Alpine Ski Manual for a full description.
- Leading with inside ski, (little toe of the inside ski to be precise)
- Javelin turns (skiing on one leg): Compress onto big toe, then rise up and then compress down onto the little toe for inside turn.
- Poling to initiate the turn. Four progressions you could use:
 - Ski with arms in correct position, pole tips dragging.
 - In a stationary position, hold the poles in the correct position (arms to the side and in front) and swing the poles back and forward with a movement of the forearm and wrist. Try to avoid dropping the arms.
 - Single turn with a pole plant.
 - Repeat to the other side.
- Develop "Hockey Stop" drills with weighting and un-weighting and edge control.

Common Basic Parallel Turn Problems and their solutions

Error	Correction
Stemming at the start of the turn	Need more speed Not un-weighting simultaneously, so not able to release the skis. Have the skier adopt the athletic position, and then thinking about rhythm again and sinking into the turn so as to apply pressure and set the edge

Error	Correction
Skis not turning	<p>Look at foot steering. Explain steering again, review the pole exercise (Drill #4). Think about twisting the inside foot /ski around as well. Simultaneous edge release and change. Earlier weight shift to the new outside ski. Initiate the turns on convex terrain, or on tops of small bumps. Apply more speed</p>
Upper body rotation	<p>Go back to holding a tea tray, truck steering wheel Dump the poles Have the skier look down the fall line at where they want to go Stand at the bottom of the run and hold out so many fingers. They have to look at you and tell you how many fingers you are holding up</p>
Skier not compressing (pressure)	<p>Emphasise up/down movement. Go back to the drills used in the Stem Christie. Compress into the turn and release coming out of the turn.</p>
Not matching the skis early enough	<p>Work on balance on being on one ski - the outside ski More speed Not un-weighting the ski, so therefore it cannot be placed into parallel.</p>
Timing error with poles	<p>Review dragging poles. Review initiation of turns by using a pole plant. Are the poles too long? Have the guest hold the poles at the appropriate length and pretend they are the correct alpine length.</p>

TELEMARK TURNS

What is a basic telemark?

The telemark position

"A telemark position is one in which the downhill ski is in the lead, and the uphill foot is trailing with the heel raised off the ski. For me a telemark turn begins with a telemark position, and ends with the opposite telemark position. Thus a telemark turn can be defined as a turn during which a transition from one telemark position to the other occurs. Franosch (2008).

What are the mechanics of the telemark turn?

By adopting the telemark position, with enough speed, steering the skis on an edged ski across the fall line. The transition from one lead ski to another is made with a forward shuffle of the skis, and sinking into the next turn, using foot steering, pressure control, edging and rotary movements to steer the skis whilst holding the telemark position at all times.

Why do we teach a basic telemark?

It is a turn that gives suburb fore and aft stability when using free heel bindings. A telemark turn is more comfortable and quicker to perform then a Stem Christie Because it is the most graceful turn of them all.

Where do we teach the basic telemark turn?

Slight downhill, on a soft to firm cover.

What previous experience is needed before attempting the basic Telemark?

Now, this is debatable, but at its core we need four elements to be present at a basic level. These are:

1. stance
2. rotary
3. edging
4. pressure control.

It does not matter how the guest has obtained these concepts at a basic level, whether that be through, snow ploughs, a basic stem or a more advanced turns.

How do we teach the basic telemark turn?

Practice a telemark straight run, changing lead ski with an un-weighting and weighting motion

- Poles and hands should be low and forward (holding the steering well again)
- Ankle flex
- Knee forward over the binding
- Weight even on both skis
- Rear foot back behind the rear of front boot
- Press rear foot down with ball of foot

Telemark Run with a diagonal lead change.

- Same lower body position as above
- Start on flat ground using the stride lead change to create forward momentum.
- Once comfortable on the flats move to a very gentle slope.
- Introduce the lead change the upper body does the counter rotation, i.e. as the right leg goes forward, the left arm goes forward as will the right (remember to be holding the tea tray) and twist the upper body across the lead (right) ski.

Editor's note: a slight turn may occur if you are on skaters, but no turn will occur when using classics.

Progression for the basic telemark turn.

There are two and perhaps many more distinct ways of introducing the joys of a graceful telemark turn. We must remember here that we are likely to be instructing our guests who are using narrow and stiff cambered skis, with no metal edges. It is from this position that I am outlining what might be seen as a more traditional approach to the teaching of a basic telemark (with the hope that it may even be useful). You can access other approaches for the instruction of a telemark turn for fat single cambered skis with metal edges from the APSI Telemark Instruction manual. If you have more success teaching the telemark turn from the direct approach on Nordic skis please ignore what I have to say and give us some feedback on your approach with teaching the basic telemark with Nordic skis.

- Review foot steering
- Review compression into each turn and standing tall to finish ready to initiate the next turn.
- Review the idea of a quiet upper body

In this stage of reviewing please use whatever turn is the most suitable for the guest. If they can parallel, review using this turn as this would be idea, otherwise whatever turn the guests are most proficient at.

I would suggest garlands to practice the telemark turn. Due to the complexity of the turn, and fewer building blocks available, it is recommended not to use the direct approach as it is too difficult to teach telemark turns in the direct approach. However, mix it up occasionally and experiment

- Stem the bottom or outside ski out
- Skis should be shoulder length apart
- skier adopts a strong telemark stance with rear ski tucked in close behind
- Foot steer the downhill ski around
- Steer inside ski in behind the front ski
- Sink back on rear ski so weight is shared on both skis
- Sink on both skis evenly to pressure the skis.
- Counter rotate upper body with shoulders down the fall line
- Hold this position until the skis finishes the turn (garland)
- Repeat in other direction.

Drills

- Tuck you rear leg in so that it is under your body
- Imagine your kneecaps are head lights and pointing these head lights where you want to go (i.e. around the turn and across the fall line)
- Rhythm: Working on sinking into the turn. Inhale deeply when standing tall in the skis to un-weight the ski. Exhale as you sink into the turn. Exaggerate the extension in the drill. i.e. being tall and flexion (being small). Parker (2001)
- Foot steering. Standing in the athletic position. Placing and holding a pole between you parallel skis, now lift up one ski and hold it across your ski on

the ground. Pivot the up lifted ski against your pole. The guest should feel pressure on the inside of the upper thigh muscle. This pressure is what should be felt when foot steering.

- Think big toe / little toe
- Drop your heel on the rear ski as much as you can. Squashing the lemon under the back heel.
- Rhythm: Working on sinking into the turn. Inhale deeply when standing tall in the skis to un-weight the ski. Exhale as you sink into the turn. Exaggerate the extension in the drill, meaning being tall and flexion (being small). Parker (2001)
- Side Slipping. Have the guest practice sideslipping, getting the feel of releasing edges and grabbing edges. Rolling knees up the hill and dropping them and finding the fall line again.
- Traverse on a steeper slope (firm snow) with good edge grip through ankle, knee and hip angulations. Discuss edge and angulation. Traverse and side slip combination, again working on feeling the edges and angulation.
- Javelin turns (skiing on one leg): Compress onto big toe, then rise up and then compress down onto the little toe for inside turn. Good for telemark and d parallel turns.
- Set up a slalom course and practice, practice, practice.

Common Telemark Turn Problems and their solutions

Error	Correction
Poling uphill, aka "spearing the salmon"	See upper body rotation error correction. Drag poles, though maintaining correct hand position Have the guest copy/ imitate you.
Skis not turning	Look at foot steering. Explain steering again, review the pole exercise. Think big toe and little toe on each turn. Javelin turns Imagine there is a head light on each of your knee caps. Point them where you want to go, like you mean it man!

Error	Correction
	Think about twisting the foot /ski around as well. More speed
Upper body rotation	Go back to holding a tea tray, truck steering wheel Hold the poles across the body in front and ensure that they stay perpendicular to the fall line. Have the skier look down the fall line at where they want to go Stand at the bottom of the run and hold out so many fingers. They have to look at you and tell you how many fingers you are holding up.
Rear foot trailing out behind skier	Squash an imaginary lemon under the heel of the boot. Tuck the rear knee cap into the inside scoop of the front knee so you can feel it there.
Skier holding the stem into the telemark turn	Start in a parallel position. Go back to a telemark run and emphasise the foot lead change Do the lead change backwards to try and get the guest to approach the turn differently Picture foot steering by un-doing a huge beer bottle screw cap with both feet
Tips crossing	Pressure control, sink into the turn.
Skier not compressing (pressure)	Emphasise up/down movement. Compress into the turn and release coming out of the turn.

Advanced Drills

- Try edging both skis at the same time, emphasizing the uphill edge of the rear ski.

- Push the rear knee up the hill so as to edge the rear ski more and independent of the lead ski.
- Change the lead ski by not un-weighting, just move the rear ski forward underneath your already telemark stance.
- Instead of moving the rear ski forward, move the front ski back.
- Javelin turns (Skiing on one leg): Compress onto big toe, then rise up and then compress down onto the little toe for inside turn.
- Set skis in a telemark position. Ensure that the rear knee can be nicely tucked into the hollow of the front knee.
 - Hold this ski position for turns both to the right and the left and just change the edges and pressure to turn the ski (no lead change). When one is turning with the inside ski ahead of the rear, you are performing a parallel turn (remember that we initiate a parallel turn with the inside ski) and doing a telemark when doing a turn with the front ski leading.
 - There are two key points here: one is to using big toe, little toe and un-weighting to initiate the turn.

Teaching Skiers with Special Needs or Adaptive Skiing Techniques

“Special needs” refers to characteristics that may necessitate adaptations of rules, equipment, or teaching methods. This section provides information on the following special needs groups.

- Older adults
- People with physical challenges
- People with visual impairments
- People with hearing impairments
- People with mental handicaps
- People with medical conditions
- People with especially poor coordination and balance
- People with emotional disturbances

In general, you need to take certain steps with skiers with special needs. By taking these steps, you will go a long way toward helping those with special needs learn to ski in a safe, enjoyable manner.

- Be sensitive to the individual participant’s needs and abilities, and gear your expectations accordingly – after all, everyone has different physical abilities and different levels of attention.
- Use common sense – don’t put the skier and yourself in danger of physical injury or exhaustion.
- Promote maximum independence, and focus on abilities, not disabilities.
- Encourage and facilitate two-way communication appropriate to the social and communication capabilities of the individual participant
- Seek additional resources if you need to modify equipment or technique
- Focus on fun and participation!

Older Adults

The following pointers should help you teach skiing effectively to older adults:

- Getting medical consent before participating is strongly recommended
- Lessons should be slower paced

- Use teaching progressions and guided discovery
- Older adults are usually less fit than younger adults, have more fragile bones, and are more likely to have arthritis or back pain.
- Allow individuals to perform manoeuvres to a comfortable limit; in other words, don't insist that all manoeuvres be technically correct. For example,
- Allow incomplete weight transfer in the diagonal stride
- Allow flexion to less than 90 degrees in double poling.
- Teach hill manoeuvres on a very moderate incline and be sensitive to feelings of fear.
- Above all, emphasize participation, socialization, and fun!

People with Physical Challenges

Physical challenges include the following conditions:

- Cerebral palsy
- Upper-limb amputations or congenital abnormalities
- Above-the-knee amputations
- Below-the-knee amputations
- Severe lower-limb disabilities

In all cases, individual assessment is essential, and it may be necessary to adapt both teaching methods and equipment.

Cerebral Palsy

Cerebral palsy is a neuromuscular condition, and it can take several forms:

- Spastic palsy – percussive-type movements because the muscles are tight.
- Athetoid palsy – involuntary movements because of fluctuating muscle tone.
- Ataxic Cerebral palsy – people with ataxic cerebral palsy have trouble with balance and coordination. They may walk with their legs farther apart than normal and have a hard time with activities that use small hand movement.
- Mixed palsy – a combination of the above types, but with one type tending to predominate.

The following tips should help you teach students with cerebral palsy:

- Wear warm clothing – spasticity increases in the cold.
- Use shorter, wider skis they make it easier to manoeuvre.
- Use warmer waxes – this may reduce back-slipping.
- Use modified equipment if necessary: offset binding, wedges in the binding system, and snowshoes instead of skis if balance is especially poor. (See Figure 1.9).
- Complete weight transfer in the diagonal stride may be impossible and the double poling action may be used only on downhill.
- Well-set, deep tracks assist stability.

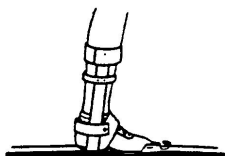


Figure 1.9 A Brace Designed to Assist with Stability

Upper-Limb Amputations or Congenital Abnormalities

The following tips should help you teach skiing to people with upper-limb amputations or congenital abnormalities.

- Use either one pole or no poles
- Effective technique in the diagonal stride is essential; using a softer wax will reduce back-slipping
- Moving stumps or increasing upper-body rotation may assist weight transfer
- Above-the-Knee Amputations
- Keep the following points in mind when teaching skiing to people with above-the-knee amputations:
 - Getting assistance from people trained in prosthetics and orthotics may be very helpful
 - The knee of a prosthesis must be fixed in position; it may be a good idea to get a prosthesis designed for cross-country skiing
 - Beginners should use shorter skis
 - Kick with the normal leg, and glide on the ski of the prosthetic leg – almost a one-step-double-poling action.
 - Double poling is often used

- Well-set deep tracks assist stability

Below-the-Knee Amputations

The following tips should help you teach skiing to people with below-the-knee amputations:

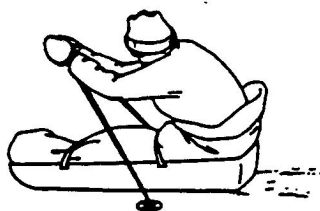
- Standard equipment is usually adequate; however, light boots are preferred
- It is usually possible to kick with both legs and so double poling is used less frequently than among those with above-the-knee amputations

Severe Lower-Limb Disabilities

Keep the following points in mind when teaching skiing to people with severe lower limb disabilities

- Sledges – fibreglass enclosed shells mounted on two skis – may facilitate the participation of cut-at-the-trunk or above-the-knee amputees, paraplegics and others unable to ski by conventional means. Sledges are usually used on relatively flat ground and skiers propel themselves by double poling with short poles. (See Figure 1.10).
- Always be aware of skiers' physical limits and the effect of the weather (especially the cold).

Figure 1.10 A Sledge



People with Visual Impairments

- Four classifications of visual impairments are used:
 - Mild. Visual acuity worse than 6/12 to 6/18.
 - Moderate. Visual acuity worse than 6/18 to 6/60.
 - Severe. Visual acuity worse than 6/60 to 3/60.
 - Blindness. Visual acuity worse than 3/60.
- The extent of a participants' visual impairment will affect your teaching methods. The following tips should help you teach skiing to people with visual impairments.
- Skiers with visual impairments may initially have problems with balance, timing and judgement of speed. However, with practice, they can overcome these problems.
- Each skier with visual impairment should have a guide. Guides should ski where the visually impaired skier specifies – either in front or at the side.
- Specific verbal cues about direction and terrain are essential. Using clock references – for example, “Turn to 2 o'clock” is especially helpful.
- Physical assistance is initially very important in developing the correct stance (Figure 1.12); for example, touch students to help them feel proper form and motion. Assistance may gradually be reduced to verbal directions. (See Figure 1.11)
- Be ready for downhills – make sure that both the body and ski are positioned correctly.
- Use progressions in your teaching and pace your teaching according to the individual skier's capacities.
- Be sensitive to skier's needs – cold, fatigue, etc.
- Give lots of encouragement at the start.

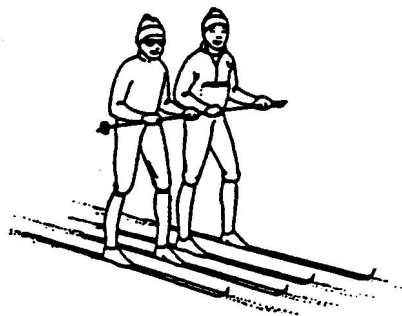


Figure 1.10 Physical Assistance

People with Hearing Impairments

Keep the following in mind when you are teaching skiing to people with hearing impairments:

- Hearing impairments usually interfere very little with cross-country skiing
- People with severe hearing impairments are sight and touch oriented. When necessary, you can gain their attention by using a specific arm or hand gesture or by touching an arm
- Some deaf persons may experience balance problems. Advise students that tilting the head back can totally disrupt equilibrium and cause severe dizziness and nausea
- Skiers with hearing impairments may not respond to noises in the environment or sounds other skiers make (for instance, “Track!”).
- In competition or public touring, hearing impaired skiers often identify themselves as such with a bib – it alerts other skiers to their needs
- Your teaching will really benefit if you get assistance from a person trained in sign language
- Demonstrate clearly when teaching about technique, equipment, or waxing
- Always face the skiers you are teaching – many people can lip-read and speak as clearly as possible

People with Mental Handicaps

The following tips should help you teach skiing to people with mental handicaps:

- Breaking skills into smaller parts and teaching these parts in sequence facilitates learning
- Skiers may initially require physical assistance. However, it is important to progressively decrease such assistance – it facilitates independence.
- Skiers with mental handicaps do not usually have physical disabilities; however, their initial fitness level may be low.
- Skiers with balance problems should use a shorter, wider touring ski.

- Having an assistant increases the skier's safety and decreases the chances of getting lost
- Having fun always motivates people to learn

People with Medical Conditions

Medical conditions affecting participation in sport include the following

- Obesity
- Heart condition
- Back problems
- Epilepsy
- Diabetes

Obesity

The following points should help you teach skiing to people who are obese.

- People who are severely obese should get medical certificate giving them permission to participate
- Lessons should be slower paces
- Skiers may have balance problems – shorter, wider skis are recommended
- Use progressions in your teaching and give lots of encouragement
- Teach hill manoeuvres on a very shallow incline

Heart Condition

Keep the following points in mind when teaching skiing to people with a heart condition

- Medical consent before participating is mandatory
- Lessons should be slower paced
- Make sure that skiers warm up and cool down

Back Problems

The following tips should help you teach skiing to people with back problems

- Ask participants to seek advice about participation from their doctor
- Wearing extra clothing can prevent muscles from going cold
- Warming up and cooling down are both essential. Stretching the back is also necessary
- Skiers should participate at the level comfortable for them
- Check with skiers before correcting their technique – they may be performing to the best of their ability
- Do not insist on completely correct technique; for example, skiers may not be able to flex at the ideal angle when double poling
- Incomplete weight transfer may cause lower back problems for individuals who have never had back problems; it may also aggravate a previous problem. Analyzing and improving incomplete weight transfer is essential
- Some hill manoeuvres may worsen back problems (eg.skiing icy terrain or moguls, so advise skiers to be aware of their limitations

Epilepsy

Keep the following in mind when teaching skiing to people with epilepsy

- Medical consent may be necessary
- Be aware of the type of seizures skiers have (grand mal, petit mal), their frequency, and the medication skiers are on
- Encourage skiers to have a buddy who can be on the alert for seizures
- Carry warm clothes in the emergency kit

Diabetes

Keep the following in mind when teaching skiing to people with diabetes

- Medical consent may be necessary
- Find out whether the skier's diabetes is controlled. Whether the skier was active before taking skiing lessons, and whether the skier eats properly before skiing

- Include sugar of some type (e.g. juice or jelly beans) in the emergency kit – you may need it if a skier has a diabetic reaction. A person having such a reaction could have too little or too much sugar in the bloodstream. Paleness, moist skin, dizziness, full rapid pulse and normal respiration indicate that sugar is needed. Rapid deep breathing (air hunger), dry skin and fruity acetone-like breath indicate that there is too much sugar in the bloodstream. Recommended first aid would include giving a conscious person sugar in some form, maintaining an open airway for an unconscious person. Medical assistance should be sought immediately
- A buddy-system may be helpful – have one skier watch out for a diabetic.
- People with Especially Poor Coordination and Balance
- Keep the following in mind when teaching skiing to people with especially poor coordination and balance.
- A shorter, wider ski is recommended
- Use progressions, and guide participants through them at a slower pace
- Give specific, clear instructions – skiers may have poor body awareness
- Teach hill manoeuvres on a short, slight incline
- Give skiers lots of encouragement

People with Emotional Disturbances

Keep the following in mind when teaching skiing to people with emotional disturbances.

- The attention span is likely to be short, and skiers will probably want to be active.
- Design a structured program, do minimal talking and emphasize participation.
- Allow participants to be leaders when touring, choosing games, or organizing relays – it gives skiers responsibility.
- Provide a positive atmosphere, lots of feedback, and lots of active participation.

SKATING TERMINOLOGY COMPENDIUM

Gear (to suit terrain)	Current APSI Terminology	Old APSI Terminology	American (PSIA)	Race fraternity	Other	Comments
1 st gear	Herringbone Skate	Herringbone skate Diagonal skate	Herringbone skate Diagonal vee	Herringbone skate	'Weeny walk' Diagonal dance Old Lady Skate	Diagonal skate in higher gear applications
2 nd gear	Offset Skate	Offset two skate	V1	Offset Paddling	Paddle dance Asymmetric skate	Most common skate used by recreational skiers
3 rd gear	Double time	One skate	V2	Double time	Double dance	The accelerator!
4 th gear	Single Time	Two skate	V2 Alternate	Gunde Open field skate	Single dance Two-side skating	Used on the flat, as well as cornering
4 th gear	Marathon skate	Half skate	Marathon skate	Marathon	Sitonen skate One-side skating	Used on the flat, as well as for cornering
5 th gear	Free Skate	Free skate	Free skate	Free skate		Skating <i>without</i> poles is not necessarily free skating (see Notes)
6 th gear	Tuck Skate	Tuck skate	Tuck skate	Tuck skate	Leg skate	

Notes:

- When introducing skating to students always use current APSI terminology.
- If a student has already been exposed to another terminology, encourage them to use the APSI terminology
- Free skating is the leg skate gliding technique (no poling) geared between the Single Time and the Tuck Skate. The upper body is involved in a flow relationship to increase glide.

CLASSICAL TERMINOLOGY COMPENDIUM

Gear (to suit terrain)	Current APSI Terminology	Old APSI Terminology	Race fraternity	Other	Comments
1 st gear	Herringbone	Herringbone	Herringbone		
2 nd gear	Uphill diagonal stride	Uphill diagonal stride	Uphill diagonal stride		
3 rd gear	Diagonal stride				
4 th gear	Stride double pole	Kick double pole	Kick double pole	One step double pole Step double pole One step	
5 th gear	Double pole				
6 th gear	Straight run	Downhill run			