

Nordic Skiing Fundamentals: *Linking Technique Breakdowns to Common Injuries*

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December 5, 2025



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Objectives

1. Introduction to Nordic Skiing
2. Key Body Positions and Movements
3. Biomechanical Links to Common Injuries
4. Over-Arching Nordic Ski Technique Themes

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Introduction to Nordic Skiing

Nordic Skiing is an aerobic, low-impact, and safe winter sport that simultaneously demands aerobic endurance and muscular power.

It is characterized by two main techniques, Classic and Skate.

- Classic Technique
 - Usually preformed on groomed trails with parallel grove
- Skate Technique
 - Skis are angled outward in a V-Shape

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Introduction to Nordic Skiing

- Equipment
 - Skis: Lightweight, long and narrow
 - Classic Skis have Grip zone, Skate skis do not
 - Boots
 - Classic boots offer ankle flexibility
 - Skate boots have stiff cuffs for lateral support
 - Poles: Taller for skating, shorter for classic

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Key Body Positions and Movements

- Body Stance: Athletic Posture, Forward Lean, Core Engagement
- Lower Body Mechanics
 - Knee & Ankle Flexion
 - High and Forward Hip Position
 - Weight Transfer from foot to foot
- Upper Body Mechanics
 - Shoulder Relaxed & Arm at 90 degrees
 - Pole Plant Angle Matching Shin Angle
 - Core & Lat Engagement

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Key Body Positions and Movements

Differences Between Classic and Skate Movement

- Movement Direction
 - Classic: Primarily Linear
 - Skate: More Lateral
- Timing and Rhythm
 - Classic
 - Arms/Leg Pair either work in unison or opposing timing
 - Skate
 - Various "V-Patterns"

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Biomechanical Links to Common Injuries

- Shin Splits: *Usually tied to excessive dorsiflexion*
- Achilles / Foot Pain: *Tied to aggressive inside-edge loading / poor foot alignment*
- Knee / IT Band Strain: *Often due to hip instability*
- Lower Back Pain: *Often hyper-extension or weak glute / core engagement*
- Shoulder / Elbow Pain: *Over-reliance on arms, poor pole-planting*

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Biomechanical Links to Common Injuries

- Foot Pain
 - When skiers collapse their arches or try to force an edge to get kick grip, it can strain the foot's structures and place undue stress on the Achilles tendon

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Biomechanical Links to Common Injuries

- Shin Pain
 - Attributed to excessive dorsiflexion of ankle / skin or over-stepping
 - Can be exacerbated by “toe-pushing” rather than powerful hip and core-driven push-offs

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Biomechanical Links to Common Injuries

- Knee / IT Band Pain
 - Similar to running, this is often linked to hip instability
 - In skiing, repeated forceful knee flexion/extension with poor alignment or overuse patterns can irritate the IT band.
 - Adding technique adjustments like Level Pelvis and Neutral Knees can ease irritation

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Biomechanical Links to Common Injuries

- Lower Back Pain
 - Arching of the lumbar spine or a weak glute/core that shifts more load into the lower back
 - This can also be seen in an Anterior Pelvic Tilt
 - In skiing, if the forward lean comes more from the back than from the ankles/hips, or if the core disengages, the lower back can become overworked

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Biomechanical Links to Common Injuries

- Shoulder and Elbow Pain
 - Can sometimes be predicted by the shoulders shrugging up or the shoulders pulling back and forth in technique
 - Often from over-reliance on arms rather than using the whole body for poling power.
 - Poor pole planting technique
 - Planting the pole too far forward or behind—can put stress on shoulders and elbows

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Overarching Nordic Ski Technique Themes

- Align the Body for Efficiency
 - Neutral spine, active core, relaxed shoulders, proper ankle/knee flex, and continuous forward lean
- Drive from Large Muscle Groups
 - Glutes, quads, lats, and core do the heavy lifting; arms and lower legs assist instead of doing all the work
- Refine Weight Transfer
 - Smoothly shift weight onto one ski at a time—this is crucial in both classic stance (linear) and skate stance (lateral)

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For Additional Questions

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