Alignment & Stance in High Performance Skiing

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What I've Learned in 10 Years

- A lot!
- Good alignment is not well defined
- Alignment and stance are the subjects of many technical misconceptions
  - A desire to find geometric simplicity in skiing

What is Alignment?

- The positions of the skier's body segments in relation to each other and to the forces acting on the skier

What is Stance?

- The collective effect of various elements of alignment
- You can always improve a person's skiing by improving his or her stance

Introduction

- Skis do more of the skiing, and the skier does less
- Greater forces in the turn
- More focus on alignment of the body to balance against forces

"I don't ski like that!"

- Yes you do!
- You balance against the same forces, they're just not as big (and you're not as strong)

Alignment is about Balance

- Each segment of your body has to be balanced on and supported by the segment below

Alignment is about Movement

- You must balance accurately over your skis while your body segments move in relation to each other

Alignment and Stance

- The segments of your body must be arranged so that you can effectively perform the movements of skiing to
  - Accurately manipulate your skis
  - Deal with terrain while balancing against the forces of the turn
- Each element of alignment addresses some element of basic technique or balance

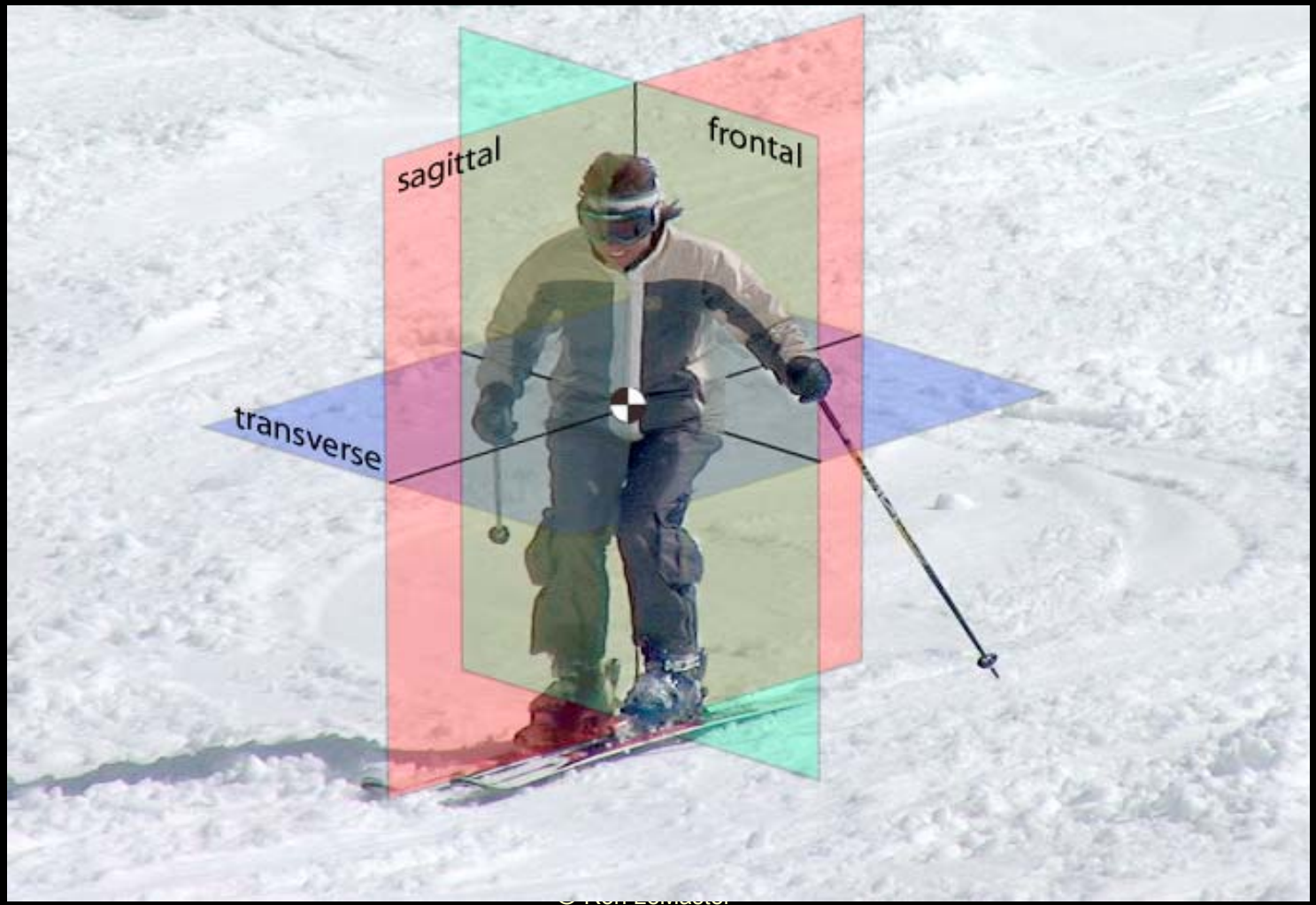
General Principles

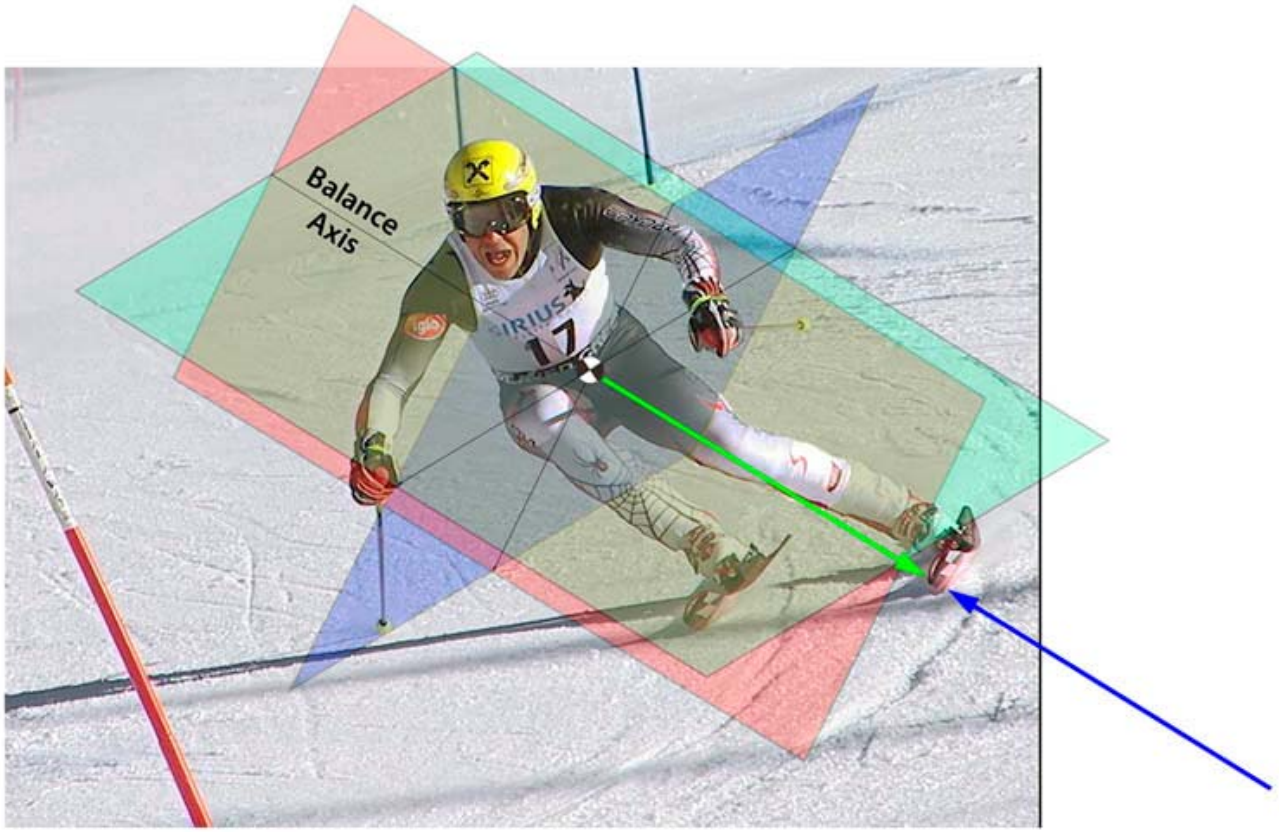
- Use the upper and lower body independently
- Use inside and outside legs independently
- Keep the core stable and supple
- Use the strongest muscles

General Principles

- Boots must be set up for the individual
- Optimal alignment varies with the individual

Frame of Reference





Sagittal Plane

Technical Misconception

- Hips must be over the feet

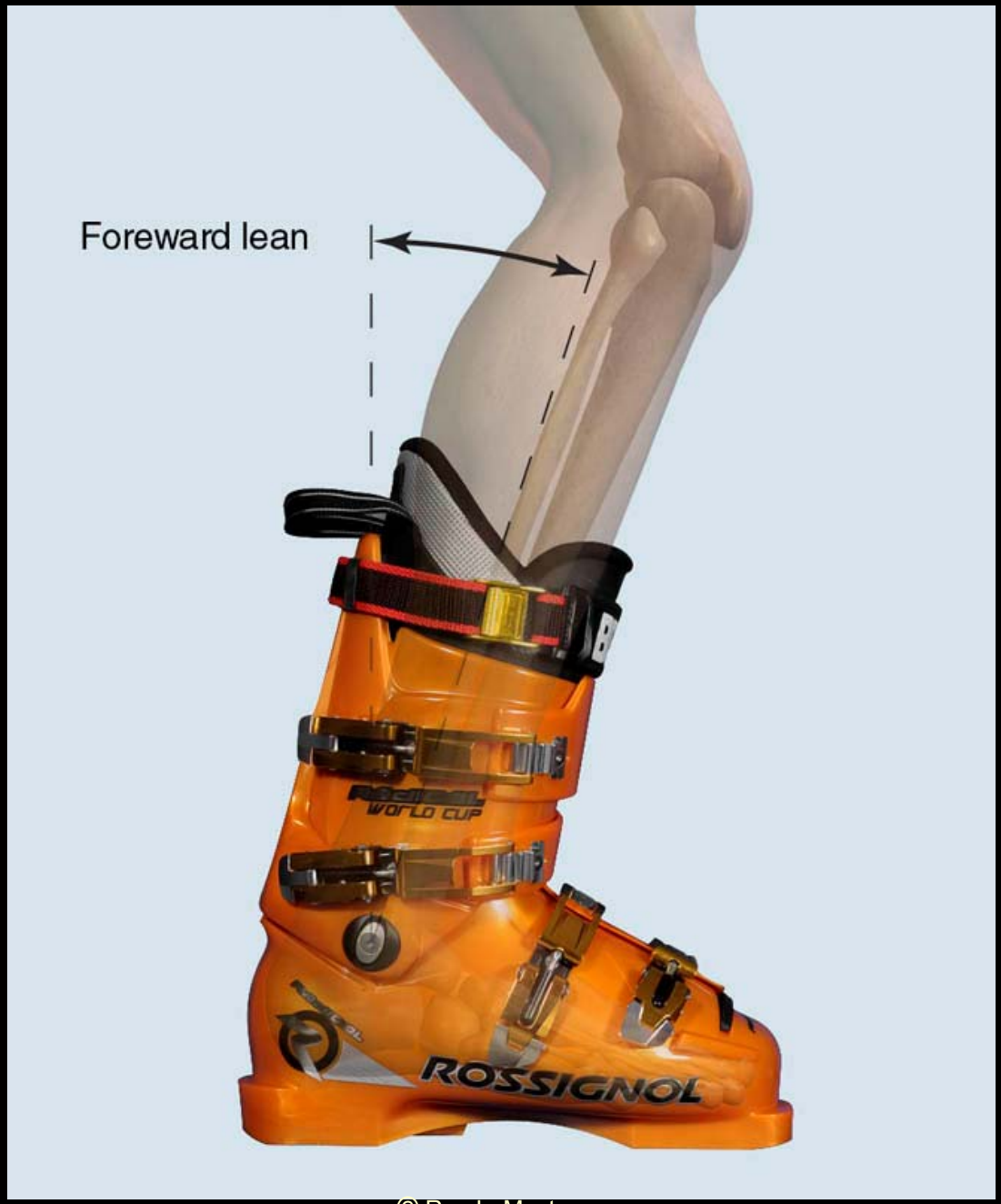
Center of Gravity over Feet

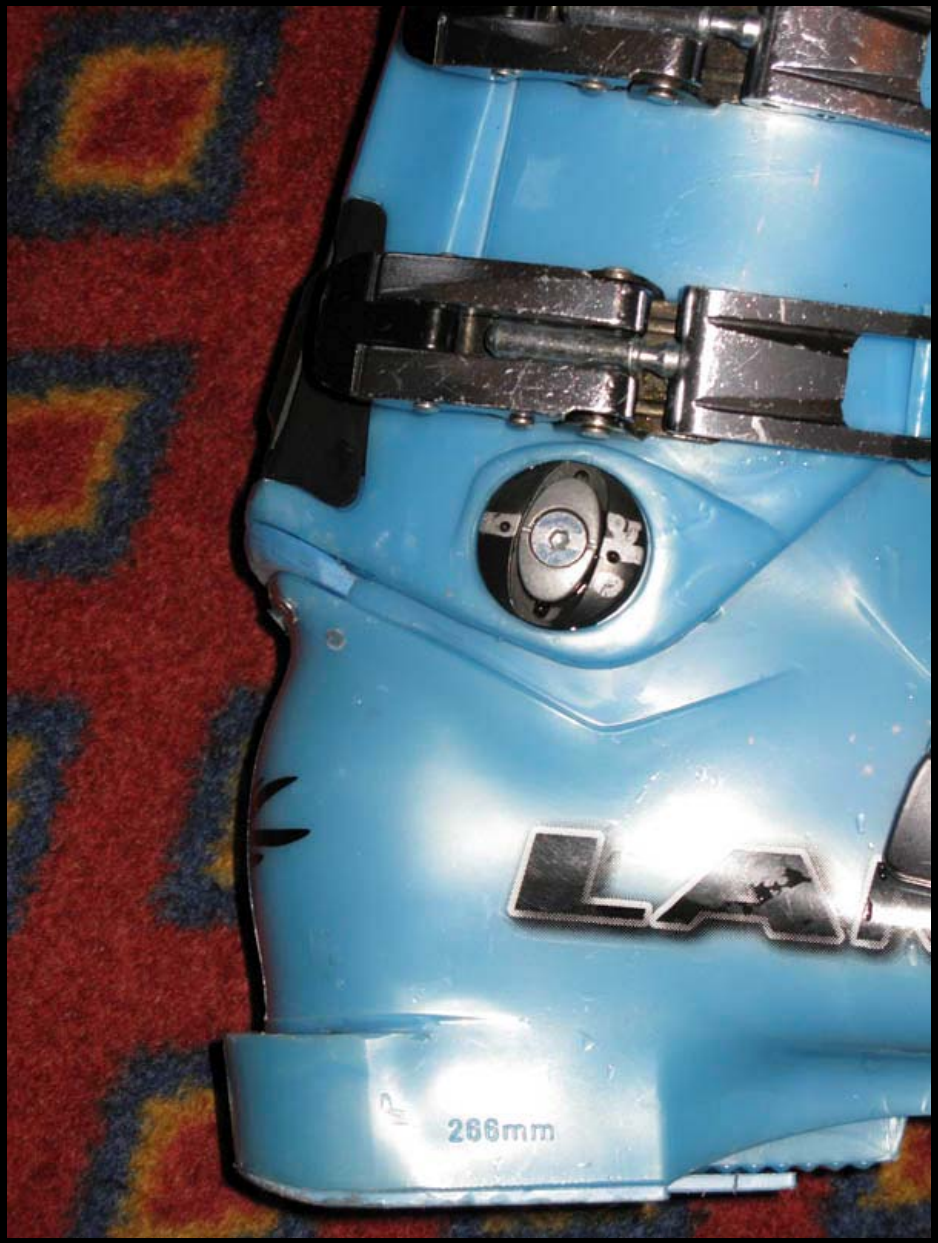
Lower Leg Angle

- Has critical effect on fore-aft balance while moving up and down
- Boots allow only small range of motion

Technical Misconception

- Boots should be upright





Independent Alignment of Legs: Lead

Technical Misconceptions

- There is no lead change in modern skiing
- Parallel alignment
  - Feet and tips
  - Hips
  - Shoulders

Lead

- Results from inclining into the turn

Hip & Lower Back Posture

Torso & Arms

Technical Misconception

- Spine and lower legs should be parallel in the sagittal plane

Torso and Arms

- Shoulder should be ahead of the hips
- Hands should be ahead of the shoulders

Shoulders Ahead of Hips

- Addresses the need to control fore-aft balance with the feet and lower legs

Frontal Plane

Width of Stance

Technical Misconception

- Feet should be hip width apart

Width of Stance

- Must allow for independence of legs
- Hard snow favors wider stance
- Powder and crud favor narrower stance
- Deep moguls favor narrowest stance

Alignment of the Lower Legs

Alignment of the Lower Legs

- Myth: Lower legs should always be parallel

Alignment of the Lower Legs

- Each has its own job to do
- Some people ski well with their lower legs parallel
- Some people don't

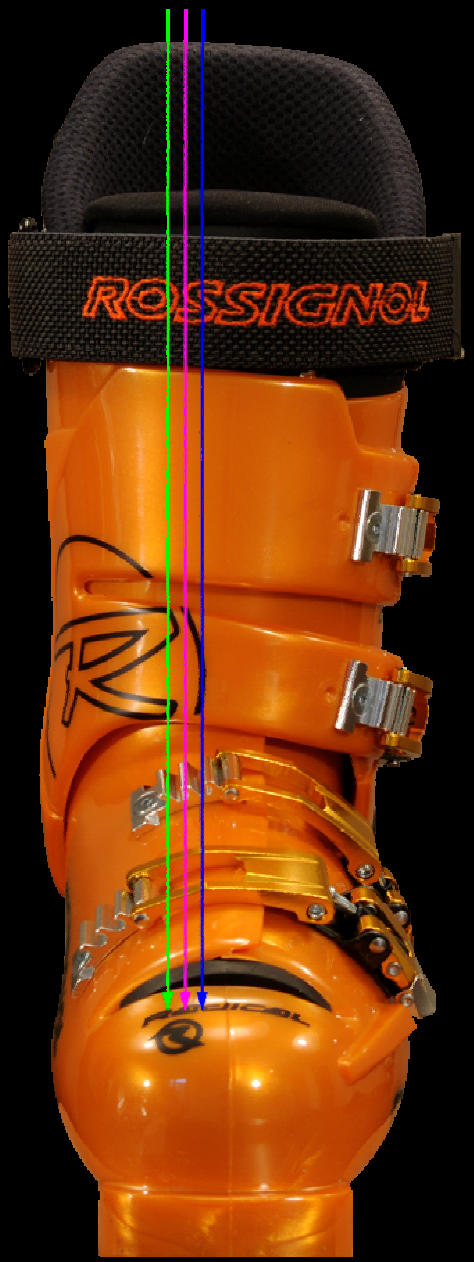
Lateral Canting

Platform Angle

- <= 90 deg., ski holds
- > 90 deg., ski slips

Lateral Cant

- When the following are lined up in the frontal plane
  - CM
  - Head of femur
  - Knee
  - Edge of ski
- The platform angle must be 90 deg



16″ / -1.5 deg
9″ / -0.8 deg
0″

Hips & Shoulders

Technical Misconceptions

- Hips and shoulders should be “level”
- Hip angulation is a thing of the past

Torso Tips to the Outside

- To balance the center of mass over the head of the outside femur
- Progressive articulation through the spine tips the shoulders farther out than the hips
- Pelvis and spinal column has limited range of motion in this direction
- Assisted by putting some weight on inside ski

Transverse Plane

Hips & Shoulders: Counter

Technical Misconception

- The best skiers don’t counter anymore.
- Everyone should stand square.

"Face the Force"

Torso Turns to the Outside

- Most supple posture for hip angulation
  - Folding forward with the torso rather than bending sideways through the spine
- Enlists the best muscles for supporting the upper body on the femur
- Progressive articulation through the spine turns the shoulders farther out than the hips

Establish Alignment in Transition

Wrapping Up

Summary

- Greater forces in the turn
- Each segment of your body has to be balanced on and supported by the segment below
- Each element of alignment is a response to some element of basic technique or balance

Summary

- Use the strongest muscles
- Keep the core stable and supple
- Establish alignment in the transition

- Don’t drink the Kool-Aid!
- Think anatomically

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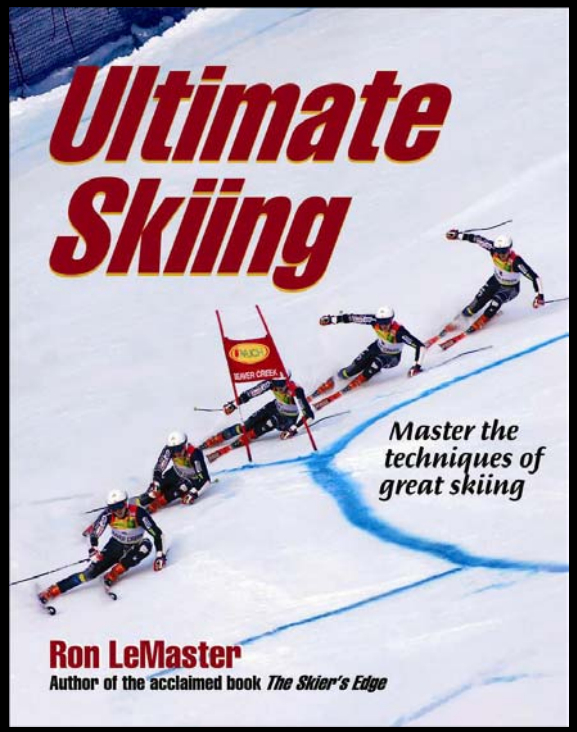

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