ILIOTIBIAL (IT) BAND FUNCTION IN COUNTER-ROTATION SKI TURNS

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INTRODUCTION: "Le ski d'aujourd'hui" was published in Paris by T. Ducia and K. Reinl in 1935; and "Natuerliches Schilaufen" was published by Swiss G. Testa and E. Matthias in 1936. Both books criticized popular whole-body rotation, and promoted instead counter-rotation of the upper body. Stefan Krukenhauser attempted to demonstrate and document this emerging technique by submitting a film to the international ski congress in Davos in 1953, but Krukenhauser's work was dismissed as "disturbing." The "reverse," or counter-rotation, became the foundation of modern ski technique that remains to this day. Considering the fragility of the knee joint, this study seeks to explain why counter-rotation provides such reliable structure in high-force dynamic ski turns.

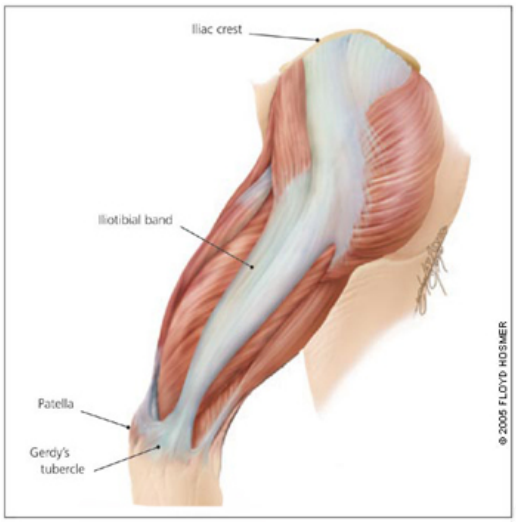

Figure 1. Lateral-posterior view of IT Band

METHOD: During hip and knee flexion the iliotibial (IT) band wraps from the iliac crest of the pelvis, posterior of the hip and the greater trochanter of the femur, and around the lateral condyle of the tibia where it inserts anterior and below the knee, essentially creating a helical, two-joint connective tissue. When the pelvis rotates laterally away from the direction of the turn (counter-rotation), the IT band stretches in the frontal, sagittal and transverse planes, which creates a relaxed, efficient structure, similar to the coil-spring suspension in an automobile. **physical model**--

Martial arts training like Tai Chi teach the Horse Stance, emphasizing relaxation (reduced tonus), pelvic tuck (reduction of lordotic curve), and twisting out the knees (lateral femur rotation and knee-joint rotation in the yaw axis). The practice intends to condition the IT band such that the practitioner learns to rely on the stable yet flexible structure of this specialized stance. The Chinese call the gradual transition from muscular reliance to reliance on the connective tissues through ever deepening relaxation, "Muscle-Tendon Changing."

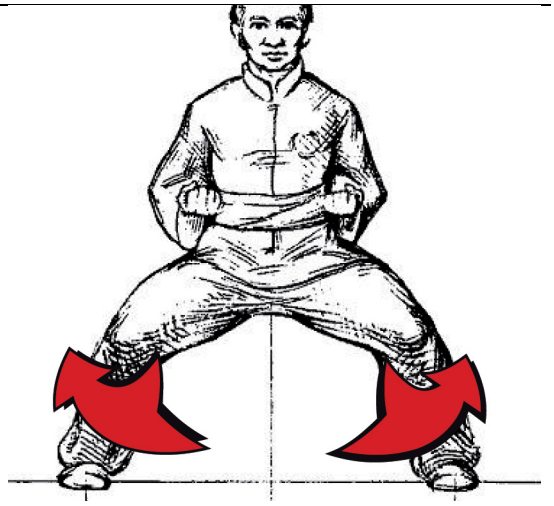

Figure 2. Horse Stance, twisting knees out

RESULTS: Counter-rotation creates tri-planar stretching of the IT band, which in turn provides critical, lateral support of each knee, and a strong, flexible posture that can withstand the immense forces of a dynamic ski turn.

DISCUSSION: Dynamic, structural use of the IT band is not exclusive to counter-rotated alpine ski turns. Water skiing uses the IT bands in a similar manner; and the emerging WaistSteering technique also uses whole-body rotation to stretch the IT band for structural reliance.

CONCLUSION: This study identified the most logical reason why counter-rotation remains the preferred technique in alpine skiing. The application of Horse Stance training and IT band reliance corroborates the theories in this study.

REFERENCES

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