Effectiveness of Metronome-Paced Training for Rehabilitation of Knee Neuromuscular Control Deficiency

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BACKGROUND AND PURPOSE

Failure to restore post-surgical quadriceps and hamstrings strength can lead to joint degeneration and disability.

Quadriceps (QU) strength deficits of 5-10% have been reported to persist for up to 7 years post-surgery

Hamstrings (HS) strength deficits of 9-27% have been reported to persist for up to 3 years post-surgery

The single-leg squat has been shown to improve neuromuscular control and proper biomechanics of the knee.

Imposes demand that can improve fine motor control and enhance co-contraction of QU and HS

Metronome training has been shown to modify corticospinal control mechanisms that improve dynamic stability.

Failure to restore post-surgical quadriceps and hamstrings strength can lead to joint degeneration and disability

Uninvolved QU

Involved QU

Involved HS

Uninvolved HS

Clinical Relevance

• Despite small sample size and lack of statistical significance, SRM values for isokinetic measures were substantial

• Large SRM values observed for uninvolved QU & HS, which apparently resulted from uninvolved extremity training

• Single-leg squat training paced by metronome may induce beneficial adaptations within the central nervous system

• Improved isokinetic performance symmetry suggests that post-surgical neural inhibition can be overcome

• Although definitive conclusions cannot be drawn, the metronome-paced single-leg squat exercise performed with visual feedback appears to facilitate a beneficial neuromuscular adaptation for improved dynamic knee stability

REFERENCES


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