MULTILEVEL EVALUATION OF MOTION AND POSTURE PATTERNS IN LOWER EXTREMITY AND SPINE USING DYNAMIC ULTRASOUND

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ABSTRACT

Introduction/Background
Evaluation of intrinsic /extrinsic muscles posture is a crucial task for physical therapy and pain treatment. Integrative assessment of pain case in order restoring postural imbalance has not been developed. **The aim** was to evaluate feasibility of motion posture analysis using M-mode ultrasound in foot, ankle, gluteus region, pelvis and spine.
Material and Method We included 33 patients (both sexes, aged 17-52 y.o.) with clinically diagnosed leg, back pain with reduced motility in spine, pelvis and lower extremity levels. Another 20 patients (aged 18-53 y.o.) without pain and related complains on MSK disorders were controls. We conducted precise physical tests, extensive neuromuscular ultrasound using M-mode to evaluate muscle thickness, CSA and motion in intervetrebral spaces, pelvis, intrinsic /extrinsic muscles in pelvis, gluteus region, foot and ankle.
Results We obtained sufficient quality panoramic scans on leg using convex 5-8 MHz probe in 2 approaches to evaluate structure and motion of extrinsic / intrinsic muscles during one session. Thickness measurements of peroneal portion, plantar intrinsic foot muscles on the plantar surfase in two transverse positions and one longitudinal using linear probe; contractility using M-mode tested in walking were most representative data. We evaluated different patterns of decreasing motility, contractility (muscle contracted / rested thickness) on M-mode during functional tests and walking at all levels in group 1 (p<0.05). We preliminary observed correlation of changes (muscle hypertrophy) in contralateral extrinsics/intrinsics muscles at same levels, due to biomechanical instability; trigger points detection corresponded to areas of hypomobility in 95% cases.
Conclusion Extensive evaluation of motion posture in foot, ankle, and gluteus region, pelvis and spine is feasible and informative protocol. Further research needed for development US patterns, conducting comparative RCT using US, CAREN, static & dynamic balance tests, pressure analysis, etc.; and to develop educational programs).
Keywords:
motion analysis ; ultrasound ; lower extremity

RESULTS

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METHODS

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adduction hip – gluteus medius m. movement M-mode pattern

Peroneus longus M-mode contractility measurement

Hiccup – diaphragm movement

Local hypomotility in semitendinosis muscke and restoring after precise dry needling

Ankle extension – M-mode pattern. Thickness measurement of the AbdH, FDB

CONCLUSIONS

Extensive evaluation of motion posture in foot, ankle, and gluteus region, pelvis and spine is feasible and informative protocol. Further research needed for development US patterns, conducting comparative RCT using US, CAREN, static & dynamic balance tests, pressure analysis, etc.; and to develop educational programs).

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