The Use of Video-Based Motion-Analysis in Orthopaedic Physical Therapy Practice

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Background

- Motion analysis is a useful tool for physical therapists (PTs) to assess and optimize movement.
- Traditionally, movement has been analyzed using visual observation in the clinic or costly, equipment-intensive, time-consuming quantitative motion capture systems in a lab.
- Recently, video-based motion-analysis (VBMA) has become increasingly available for smartphones/tablets and require little to no equipment and minimal to no cost.
- Research in this topic is currently limited.

Research Objectives

The purpose of the present study is to:

- Explore the use of VBMA in orthopaedic PT practice, including frequency of use, potential facilitators and barriers, and device and apps used.
- Examine characteristics associated with VBMA use.

Methods

- Online self-reported survey taken by Orthopaedic Section members of the American Physical Therapy Association.
- Analysis sample: licensed PTs, practicing at least 4 hours/week treating primarily orthopaedic-related injuries.
- Survey vetted through survey expert at Northwestern University and focus group of 11 experienced PTs.
- Survey was administered through Redcap.

Results

- 470 respondents who met inclusion criteria.
- Only 225 (47.8%) use VBMA (Figure 1).
- Of those who use VBMA (n=225),
  - 205 (91%) use it for 1-25% of their caseload.
  - 130 (58%) use their personal device, 97 (43%) use a patient device, and 88 (39%) use a clinic-issued device.
  - 119 (52.9%) use a tablet/smartphone as a primary method for performing VBMA.
  - 207 (92%) chose visual feedback, 205 (91%) chose analysis of movement, and 117 (52%) chose assessment of progress as a reason for use.
  - 119 (53%) use a single video camera on a tablet/phone; 102 (45%) use a VBMA app.
- Of those who use VBMA apps (n=102),
  - 47 (46%) selected Hudl/Technique, 22 (22%) selected Coach’s Eye, 15 (15%) selected Dartfish.
- In those who do not use VBMA (n=245), barriers for using VBMA:
  - 229 (93%) selected lack of device/equipment, 229 (93%) selected time restraint, and 151 (62%) selected unfamiliar with device/equipment.

Results (cont)

- Statistically significant differences were found with age, years of experience, APTA board certifications. Those who are more likely to use VBMA include:
  - Younger age (40.6 vs. 43.3 years of age, p=0.013).
  - ≤ 15 (vs. >15) years of experience as a PT (59% vs. 41%, p=0.054).
  - APTA board-certified specialists (68% of board certified group vs. 44% in none or other certification group, p=0.001).
- Clinical practice hours per week, time spent with patients for initial or return visits, geographic region, delegation to PT assistant/aide, practice setting, or terminal PT degree did not predict VBMA use.

Methods

- Utilized self-report methodology, which can be subject to reporting bias (e.g., social desirability bias).

Limitations

- The present study was limited by the fact that it:
  - Assessed only those within the Orthopaedic Section of the American Physical Therapy Association, which limits the generalizability of the results.
  - In future studies, it would be beneficial to examine the use of video-based motion analysis among other APTA section members.

Conclusions

- Majority of orthopaedic PTs do not use VBMA.
- Of those who use VBMA, most utilize it for 25% or less of their caseload.
- Those younger, with less clinical experience, and board certified are more likely to use VBMA.
- Future research should explore validity/reliability of VBMA and patient outcomes with use of VBMA.
- PTs can use this information to explore the use of VBMA, including VBMA apps, in clinical practice. PTs can also use this information to educate colleagues who are not using VBMA.

References