Manual Therapy Dosage?

Translating Forces and Reasoning into Manual Prescriptions

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Manual Therapy Effects

Randomized Controlled Trials
- Deyle et al 2000: Knee
- Bang & Deyle 2000: Shoulder
- Deyle et al 2005: Knee
- Whitman et al 2006: Lumbar spine
- Walker et al 2008: Cervical spine

Cohort Studies
- Rendeiro et al 2005: Frozen Shoulder
- Rhon et al 2009: Knee
- Ayotte et al 2009: Foot/ankle
- Hando et al 2009: Hip
- Rochino et al 2009: Lumbar spine
- Harris et al 2011: ACJT

Concepts of the Manual Approach

Clinical Reasoning
- Carefully considering different origins of symptoms (importance of body chart)
- Hypothesis testing
- Minimizing risk of over-examining and over-treating
- Judging how vigorous to examine and treat
- Tailoring the exam to the patient
- Considering all aspects of the patient management cycle
- Gain thorough understanding of the patient's problem

Simple approach, but considerable effort and time to master

Clinical reasoning
- Advanced communication skills
- Utilizing signs and symptoms to understand problem behavior
- Medical and musculoskeletal differential diagnosis
- Manual examination & differentiation of regional symptoms
- Treatment by movement
- First resistance (R1) & end of movement (R2)
- Behavior of pain and resistance through range

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Clinical Therapy Dosage?
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Manual technique, the length of time, and the number and frequency of treatment sessions

Oscillation amplitude, frequency, duration, displacement/amount of movement occurring during oscillation

Force magnitude, amplitude (difference between maximum peak and minimum trough) and direction/vector of the applied force

Clinical Therapy Dosage?
Parameters

Episodes of Care

Number of visits, length of visits, length of care episode, number of areas treated

Randomized trials showing good effect sizes vs comparable interventions out to 6mos-1 year

6-8 Visits over 4-6 weeks
30-45 min visits, 2/wk typical
Treat area of complaint & related areas PRN

Does your practice pattern look like this?

Clinical Therapy Dosage?
Movement Impairments

Area of complaint is examined for relevant impairments to movement that contribute to sxs

Areas distant from complaint are examined consistent with known referral patterns

“Manual therapy is treatment by movement, not treatment by force.” - Dr. Gail Deyle

How do you determine how to dose movement?

We need a way to describe and communicate movement examination and treatment

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Mobilization Grade

Basic Descriptions

- Grade I: Barely through R1
- Grade II: Near R1
- Grade III: 50% of R1 to R2
- Grade IV: 75% of R1 to R2

Advanced Descriptions

- Measurement Systems
  - Reliable and valid for interface force and pressure measures
  - Analyzer
  - Measurement mat
  - Calibration device

Parameters

- Force (Newton)
- Time (seconds)
- Early Resistance
- End-Range Resistance
- Grade III
- Grade IV
Optimal dose of joint mobilization is not known.

Preliminary evidence suggests a critical level of force to produce a hypoalgesic effect in patients with lateral epicondylalgia (McLean 2002).

Higher applied force (90 N) during a single application of cervical spine mobilization significantly reduces spinal stiffness in patients with chronic, nonspecific neck pain (Snodgrass 2014).

Manual Therapy Dosage?

Early work was focused on biomechanics.

Mechanisms research has shifted toward neurophysiological effects as most likely.

Manual therapy precision of dosage, force and technique probably matters for:
- Patient tolerance
- Targeting of appropriate impairments
- Use in your clinical reasoning process

Reliability and reproducibility are important.

Reliability

Forces therapists apply when performing the same technique vary.

Can't attribute treatment effect to a particular technique/dose.

Reliability
Hypothesized Effects of Manual Therapy

External forces are thought to be an important part of the mechanism of treatment effect. Mechanical forces may initiate a cascade of neurophysiological responses from the peripheral and central nervous system.

Forces and technique prescription are important:
- Prescribed dosage
- Communication
- Research variation


Conclusion

What are Mobilizations?
Forces applied during a joint mobilization treatment are subjective to the individual therapist and may have an important effect on patient outcomes.

Relevant effects are expected using a manual therapy process.

Therapists are delivering manual therapy with precision and with consistent results.

Lab Outline

Basic mobilization constructs are the same for every body region and movement.

Extremity (Knee):
Knee Extension, Flexion

PliaNce:X System Feedback:
R1 and R2 assessment
Force, frequency, and amplitude
Knee Extension

Patient position
Supine, knee in extension

Therapist position
Distal hand: Grasp lateral ankle
Proximal hand: Place heel of hand on/near tibial tuberosity, fingers extended towards toes

Knee Flexion

Patient position
Supine with knee flexed

Therapist position
Place the proximal hand on the knee and the distal hand on anterior ankle

Assessment technique
Flex knee into desired range
Keep knee and hip in straight plane motion

Pliance Setup and Techniques

Extension Assessment/Extension Mobilization
Flexion Mobilization

Pliance-x System

Pliance-x system recording during progressive force application

Early
Grade
End-Range
Force (Newtons)
Early Resistance
Force (Newtons)
Grade IV
Force (Newtons)
End-Range Resistance