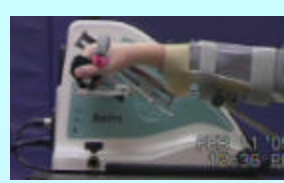


Improving Hand Function in Childhood Scleroderma Using Continuous Passive Motion

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Purpose

We evaluated the effectiveness of CPM to further improve hand function in an adolescent with localized scleroderma after receiving state-of-the-art treatment for a 3-year period of time.

Intervention History

1. Symptoms began (Aug 2001)
2. **Wrist cock-up splint** (Dec 2001)
3. **Edema glove**, methotrexate started, no diagnosis yet (Jan 2002)
4. Methotrexate stopped; not helping (Feb 2002)
6. Dx with localized scleroderma; methotrexate re-started (May 2002)
7. Attempted to get CPM, denied 3 times, 2 appeals (Aug 2002)
8. **Static progressive composite flexion splint** (Aug 2002)
9. **Casted MCPs** in flexion (June 2003)
10. Changed cast to MCP hyperextension with IPs free (Dec 2003)
11. Changed cast to night-wear only (Feb 2004)
12. AROM ↓, cast again?, patient declined, methotrexate ↑ (Aug 2004)
13. **CPM started** (Dec 2004)
14. District Winner in the National Piano Auditions – Intermediate Class (May 2005)
15. 1st Chair, 1st Violin Section in Spotsylvania All County Orchestra achieving "Concertmaster" (Jan 2006)
16. 5th Chair Violin at Piedmont Junior Regional Orchestra (Oct 2006)



Discussion

The *addition of CPM* to the treatment regimen in a young adolescent musician with scleroderma improved active ROM of finger joints resulting in *sustained* improvements in all daily functional activities, including violin and piano performance for the past two years. Ongoing AROM and grip/pinch strength measurements guided and facilitated the hand therapist's intervention choices. Motion analysis kinematics provided additional and valuable dynamic data supporting the efficacy of CPM in localized scleroderma.

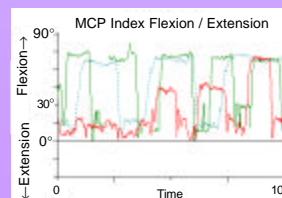
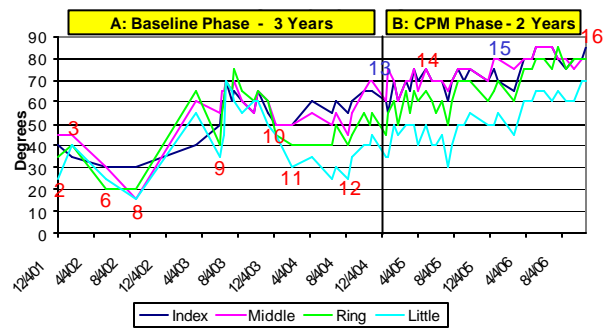
Functional Outcomes after CPM

At the Participation ICF Level

- ♣ Increased MCP, PIP and DIP flexion of finger joints that enabled full octave stretch and concert-level piano & violin performance!
 - ♣ *Priority:* Increased MCP flexion of 4 fingers
- ♣ Improved endurance with decreased fatigue and elimination of pain during prolonged violin and piano play, and keyboarding
- ♣ Handwriting endurance & quality of note-taking (without fatigue or pain) equal to the ability of her middle school peers
- ♣ Ability to perform push-ups in P.E. class
- ♣ Ability to knit without pain or fatigue

Results

MCP Flexion AROM



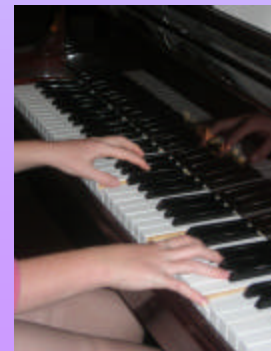
Comparative Kinematics

Dynamic excursions of Right Index finger MCP joint during 5 trials of repeated flexion/extension movements

Red = After 2 months of CPM (Right Index)

Green = After 13 months of CPM (Right Index)

Blue = Normal Reference (Left Index)



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