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Complex made Simple...clinically relevant education by Judy C. Colditz, OT/L, CHT, FAOTA

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ClinicalPearls

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IS MANUAL PASSIVE MOTION ALWAYS THE BEST TREATMENT OPTION?

As a result of many years of treating patients with hand stiffness, I developed the concept of two classifications of stiffness: early stiffness and chronic stiffness. Early stiffness is the result of post-injury/post-operative edema, brief immobilization, and the beginning of tissue healing. Chronic stiffness demonstrates significant resistance to passive joint motion with accompanying chronic edema and tissue adherence. Although I am unable to chronologically define exactly when early stiffness ends and chronic stiffness starts, each is easily described by the common terms of "soft end-feel" or "hard end-feel" when describing the response to passive joint motion. The soft end feel describes the edema and the easily modified, still tentative beginning of tissue adherence. The hard end feel describes the more mature cross-linked collagen that mechanically prevents motion.

In my opinion, the use of manual passive range of motion as a treatment technique should be used very differently in each of these two types of stiffness.

Treating Early Stiffness

Early stiffness resulting from edema, brief immobilization, and the beginning of tissue healing can be effectively influenced by gentle, slow passive range of motion. This must be defined as a non-painful gentle urging of the tissues to move just beyond what can be done actively. When held at this end range for a brief time, the tissue accommodates and a gentle urging into a greater range is possible. Often one treatment session can make significant gains in the range of joint motion, because the patient can now easily repeat the gained range actively. This increased active motion in turn invigorates lymphatic pumping thus reducing edema which in turn decreases the resistance to motion and the patient makes dramatic strides in regaining normal motion.

Treating Chronic Stiffness

Because the response to gentle manual PROM is so positive in early stiffness, we assume the same response will occur with chronic stiffness. Therefore the common treatment session often consists of the application of heat followed by passive stretching to all the stiff joints. At the end of the treatment session the patient's joints are more mobile and "feel" looser. But the short term positive response seen as a result of this stretching is not retained and the patient returns to therapy with no demonstrable gains maintained. The collagen has developed significant cross-linking and the brief session of stretching does not alter the cross-linking. The response of "looser" joints is the elastic response to the stretch and not the plastic response. To obtain a plastic (permanent change) response a more prolonged application of stress must be applied to the tissue.

This concept is likely confusing to those who treat larger joints. The knee, for example, has the large and powerful quadriceps muscles to direct power to extend the knee joint actively after a passive stretch for extension. In the human hand such a joint stretch is not as effective because there are

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no muscles that go just to one joint. This means muscle power will move the looser joint/s instead of the stiffer joint/s.

Additionally, the brain re-learns the definition of finger movement based on the maladapted pattern of movement caused by the stiff joints; even if the joint stiffness was magically removed, the brain initiates the maladapted pattern because that has become the new normal.

In my opinion, effective mobilization of chronic stiffness never consists of manual passive range of motion during a therapy session. Instead, constructing a device that demands active motion be directed to the stiffest joint/s allows joint motion to be repeated throughout the day, encouraging the tissue to alter the cross-linking based on consistent application of repetitive, gentle stress. This intermittent yet consistent stress has a far greater duration than a quick passive stretch and is thus more effective altering the cross-linking. The fact that the mobilization is achieved actively means the patient simultaneously re-learns the accurate pattern of motion.

This core idea of approaching chronic stiffness differently supported the development of the Casting Motion to Mobilize Stiffness (CMMS) concept and more recently the concept of Active Redirection. Explanation of the CMMS technique can be found in the latter part of the chapter *Therapist's Management of the Stiff Hand* in the 2011 edition of ***Rehabilitation of the Hand and Upper Extremity***. An explanation of the concept of active redirection can be found in an article written for both the ***IFSSH e-zine*** and the ***ASHT Hand-On Newsletter***. Specific examples and explanations of this treatment approach are also explained in HandLab's Online Video Courses: 1)The Obstinate PIP Joint and 2) Nuances of Mobilizing the Stiff Hand.

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