



The Hand and Wrist: Enhancing Your Approach to Assessment and Treatment Mini Series

Session Three: Treatment and
Rehabilitation Principles and Approaches

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- When considering treatment and rehabilitation approaches of the Hand & Wrist it is suggested to consider four areas which I have named the 4i's of rehabilitation; Impact (Seeing where to go = Injury resolved), Insight (Knowing you have got there = objective measures), Ideas (Knowing how to get there = Process), and Innovation (Pioneering new ideas = out of the box approach). Have a clear process when approaching injuries in these areas will provide the best possible management.
- Impact and Insight have been thoroughly discussed through presentations I and II of this series by providing thorough information around types of injuries and objective measures/special tests. Another area which also needs to be considered when discussing insight is functional movement and sport specific actions (if considering sports, this could also be work specific for the non-sporting population)
- Functional movement aims at highlighting Left vs Right asymmetries. Clear and objective criteria are required in order to help repeatability, providing appropriate objective measurements. Tests are easy to use, and movement patterns incorporated are fundamental within most sport training and competition environments. For the non-sports population, specific considerations need to be made. This form of testing assesses the whole kinetic chain, and therefore identifies gross movement restrictions. Further assessment should be performed when deficiencies are observed. The patient/athlete should be issued with simple, individualised programmes to target problem areas. Reassessment using the same criterion is important in order to objectively analyse changes.
- Sport specific actions, or work specific actions in the non-sporting population, are important in order to assess specific pathologies, severity, and also to assist in injury progression. Sport/work specific actions are very good objective markers as they provide the clinician with the main limitations caused by the pathology, and hence main target for the athlete/patient.
- When considering whether an injury requires either a conservative or surgical approach a multitude of factors need to be considered apart from the current symptoms and limitations. Timescales should be considered based on knowledge of the sport/activities being undertaken, knowledge of the healing process (physiology), previous experience (same injury/same patient/athlete), evidence based literature, athlete/worker intentions, and above all upcoming commitments. Time-scales should never be set in stone but rather used as guidelines. These should always be supported by subjective/objective markers. Pain, ROM, MP and functional movement are best suited.
- There is a wide array of treatment techniques that can be used. These need to be chosen based on the required physiological response. In the initial stages of injury ice & compression at the hand are important modalities in order to manage swelling and subsequent loss of function. In the first 6hrs, the bleeding stage, ice should be applied for less than 10mins in order not to affect the subsequent inflammatory response. After 6hrs, applying ice for 15-20minutes is advisable. Compression, together with ice is a good strategy for the acute injury.
- Mobilisations are good techniques to restore joint mechanics, or if performed with an oscillatory approach can be used for pain management. Consideration for Convex-Concave rules, treatment plane, loose-open packed positions, and end feel is important in order to be effective.
- Electrotherapy can be a useful adjunct to the treatment approach. Laser can be used at all stages of healing, although best avoided in the bleeding stage. The main indication is for ligamentous type injuries. Ultrasound is also another useful modality. Low intensity pulsed ultrasound (LIPUS) appears to be recommended for treatment of fractures. It is operated at very

low frequencies (0.03W/cm²) and at a frequency of 1.5Hz. Application with a static head is of 20mins, which is considered safe based on the static settings.

- Heating in the form of either superficial or deep is recommended for treating hand and wrist injuries. Superficial heat can be applied using wax baths, although heated bags can also provide a similar result. Superficial heat can either be used pre-mobilisation treatment to improve the local circulation at the hands (epidermis, dermis, tendons, extra-articular ligaments, and potentially muscle). Alternatively it can be used post treatment to assist in pain management. This is particularly useful after any aggressive treatments (e.g. acupuncture or certain mobilisation techniques). Deeper structures, like joint capsule and intra-articular ligaments might benefit from Shortwave Diathermy, which can be either pulsed or continuous and is delivered using electromagnetic energy. Arthritis and other conditions causing chronic inflammatory responses are indicative.
- Soft tissue therapy is a very useful approach which elicits both physiological and psychological responses. At the hand the Interossei, Thenar and Hypothenar areas develop a lot of trigger points which cause both symptoms and dysfunction. Extrinsic muscles at the forearm need to be considered as not only do they control the majority of movements occurring at the hand/wrist, but can develop referred pain which can be assumed to come from more local structures at the hand/wrist.
- For tissue scarring and fascial restrictions around local structures of the hand and wrist, which are associated with pain provocation, instrumented assisted soft tissue mobilisation techniques are highly recommended. There is good evidence on symptom resolution in both conservative and post-operative scenarios. This can be useful in combination with more traditional forms of soft tissue therapy techniques.
- Acupuncture is a specialised technique that can be highly effective at the hand and wrist. Local application to injured ligaments appears to yield good results in clinical practice. Several points have also been utilised which have equally yielded good results for MSK injuries. These include; LI 4, EX7, EX9 (Baxie), Pahrshieh, LI 5, EX3, TH 4, and the 'Eyes of the Knuckle'. In sports, it is not recommended to apply for more than 10mins due to stimulation of excitatory/inhibitory pathways of CNS which could affect performance. This also needs to be considered with non-sporting population based on the required outcome.
- In conjunction with hands-on treatment approaches, taping and splinting techniques are extremely useful with good evidence around their use. Taping can be either rigid or not (elastic). Rigid tape is used to offload injured structures, whilst still allowing function to continue. When more support or more prolonged applications are required splinting can be used either through rigid thermoplastic or soft splinting. Elastic tape is useful particularly for compression around an injury or to provide a lower level of protection than rigid tape. Another form of tape is kinesiology tape which can be used for lymphatic venous return, proprioception and a more functional approach towards support. For most injuries, a combination of different materials can be utilised dependant on the required indications.
- When considering treatment approaches, injections can at times be required in order to decrease the inflammation in the area and allow a better healing response. As a general rule, steroid injections should be considered as a last resort of the conservative approach, allowing for the appropriate treatment and rehabilitation strategies to take effect. Due to small joint spaces, only a minimal amount of steroid is usually administered, this however will still have a systematic effect and therefore appropriate contraindications need to be understood. This form of therapy should only be administered by certified professionals. Prolotherapy is another form of injection that utilises an irritant solution aimed at improving the healing process. This is recommended for CMC joints injuries to assist stability in the area.

Autologous or PRP type injections are not commonly utilised, when compared to other areas like the elbows and knees.

- Rehabilitation is an important aspect of any treatment approach and should be timely, as well as the exercises appropriately selected based on underlying biomechanical knowledge and evidence base. At the hand, it is important to consider both intrinsic and extrinsic musculature, as well as how the pull of the tendons will effect ligament tension and carpal bone movement. Exercises should also be chosen based on their level of difficulty (i.e. amount of force placed on the structures). Different equipment can be used including; putty, bands, flexi-bars, dumbbells, barbells, weighted plates, and bespoke equipment like vertical/horizontal rollers. When choosing exercises it is important to also consider the required muscle action; isometric, isotonic (concentric vs eccentric), and plyometric
- More specialised equipment for rehabilitation is an isokinetic machine which allows for resistance to occur throughout range of movement at constant speeds. This allows for more specific rehabilitation of the hand/wrist musculature by specifically choosing the speed and actions required. Proprioception can also be assessed and trained using this equipment. A far less expensive tool for training proprioception through muscle co-contraction is a device known as a power ball which has been identified in the literature to significantly improve muscle endurance.
- In conclusion, it is important to assess all structures relative to functions. It is also important to use appropriate outcome measures that will mark the stages of progression. When treating any injury at the hand and wrist it is always advisable to use a combination of hands-on and rehabilitation exercises. This irrespective of whether it is a conservative or operative approach. Finally, due to the complexity of these anatomical areas and the continuous research it is very important to maintain the required update in order to be effective.