

# Velcro-less splint design for 1<sup>ST</sup> Carpo-Metacarpal Joint Arthritis

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## Purpose

The purpose of this poster is to provide alternative options / solutions for custom splint design for 1<sup>st</sup> CMC joint arthritis management.

## Background

A Custom fabricated 1<sup>st</sup> CMC joint splint is required to be worn 23 hours per day/7 day per week to successfully manage the symptoms of CMC arthritis at the base of the thumb

## TRADITIONAL TREATMENT INCLUDES:

Cortisone shots, no splints, over the counter splints, custom splints like thumb spica, the Judy Colditz splint design etc. Traditional treatments also include Modalities and therapeutic procedures along with education in joint protection and use of adaptive devices.

## REASON FOR THIS TREATMENT APPROACH

Lack of information by the treating physician on the various treatment approaches a therapist can provide including custom splints.

## NEED FOR MODIFICATION OF THE SPLINT

The CMC splint is to be worn 23/7 to be effective. This requires that the splint be worn during all ADL's (cooking, cleaning etc.) This results in the velcro straps getting wet resulting in skin irritation and poor hygiene. Patients therefore tend to avoid use of the splint with functional activity which is when it is needed most. Additionally, the velcro snags on clothes, and loses its effectiveness over time. Lack of compliance with splint wear due to the above reasons prevents effective protection and management of the CMC joint.

## Problems with previous treatment approach

Patients do better with splinting than without to prevent the progression of CMC arthritis. Splints can be over the counter or custom fabricated. There is no harm in therapists using pre-fabricated orthosis. At times it may be the best option for the patient.

There are times, if we get creative, that we can offer our patients a much better solution with custom braces. This, in the long run, proves to be more cost effective. We can avoid the common problems associated with velcro (snagging, getting wet, losing its effectiveness, etc.) by replacing it with a better design.

In addition pre-fab splints require an out of pocket expense, whereas custom splints are covered by most insurances. Thus, a custom splint can prove to be more cost effective to the cost conscious consumer. Furthermore, pre-fab splints can be extremely expensive to use on mission trips or with state health care systems like Medi-Cal where innovative cost effective solutions may be needed.

A custom fit orthosis ensures better patients compliance to splint wear by providing a customized approach.

## Reason for the Velcro-less design

- Providing a splint design without velcro which proves to be effective without the secondary problems associated with velcro. This design provides better hygiene, no velcro snagging or wear resulting in decreased effectiveness
- Custom splints provide better support than the soft splints available in the market.
- Insurance companies do not pay for pre-fabricated splints. Thus, there is increased cost for the patients.
- Custom splints add to the earning potential of the therapists compared to the use of prefabricated splints.

## 1<sup>st</sup> CMC brace

The CMC brace designed by Judy Colditz works exceptionally well. However, the complaints reported by most patients are related to the velcro snagging, strap getting wet with hand washing. This results in poor hygiene, wet straps, velcro snags and loss of effectiveness with long term use.

We recommend the splint be worn 23/7 for a month and then, once the acute symptoms have subsided, switch between comfort cool and the custom splint thereafter. Patients are treated 1x week with paraffin, ultrasound, electric stimulation and lifestyle modification with use of adaptive devices for joint protection.

Most patients experience a complete resolution of their symptoms, however, return to us due to the above velcro issues.

This prompted us in using the BOA technology wheel design.



## Modifications for 1<sup>st</sup> CMC brace

The CMC brace designed by Judy Colditz splint is a great design, however, in order to make it more user friendly and gain greater compliance with splint wear, we made some modifications.

- Fabricated a no velcro splint design using **BOA technology s-1 reel system**, which is small, compact, and is a wind-unwind style fastener.
- Eliminates the repeated replacing of the velcro strap.
- Eliminates patient's complaints of velcro snagging on clothing's.
- This system is used mostly in ski boots to ensure good fit while in wet conditions.
- The splint is constructed with the radial and ulnar sides lifted a bit higher to ensure that the nylon wire provides a snug fit without digging in the skin.
- The fit and compression to the joint is provided by winding the reel. The pull is always away from the thumb to the ulnar aspect of the hand, thus can never be worn incorrectly.

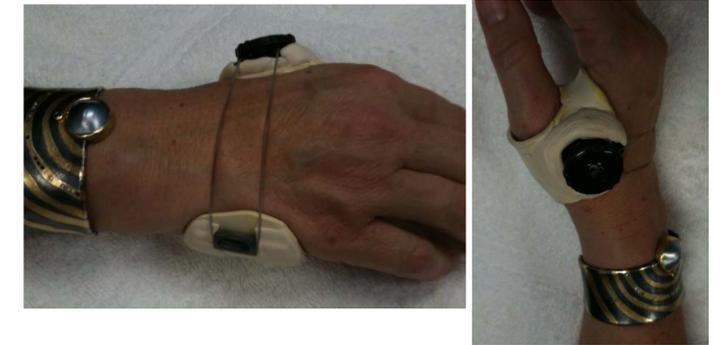
## Discussion & Recommendations

Based on the patient feedbacks, it is concluded that the

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modified splint works exceptionally well in Grade 1 through 3 stages of CMC arthritis. This modified design improves compliance due to ease of wear. Patients wore it long term as the splint did not have velcro and the associated problems of velcro were therefore eliminated. This increased compliance and long term wear resulted in a decrease in pain.

We are confident that therapists will be able to take this idea and develop even better designs to customize it to their individual patient's needs

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