

Wide buddy loop splint for the treatment of Radial Collateral Ligament of MP joint of the Index finger

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Abstract

The literature offers little in terms of conservative treatment or even therapy after surgery for treatment of Radial Collateral Ligament of Index finger MP joint. Other than casting or Aluma foam there is not much to offer to these patients with Index RCL injuries. The significance of this injury remains underestimated and requires a high index of suspicion. The treatment either ends up in a stiff MCP joint limiting a full fist or an unstable one causing pain with pinch or grip.

This article offers insight into splint design to allow for early protected motion, improve splint compliance, reduce rehab time, and provide better functional outcome for conservative and post-surgical cases.

This article introduces the fabrication of a simple wide buddy loop design splint to tackle this injury for quick and effective way. The indications and functions of the splint is discussed. The fabrication process is illustrated; including materials needed and steps of molding. Wearing regime and precautions is highlighted to ensure effective patient compliance to splinting program for the finger injury.

1. [Introduction](#)
2. [Purpose of the orthosis](#)
 - A. [Materials](#)
3. [Fabrication steps](#)
 - A. [Fabrication components](#)
 - B. [Case example](#)
4. [Supplementary data](#)
5. [References](#)

Highlights

- Allows for limited protected movement of the MCP joint of the index finger with use
- Prevents MCP joint of the index finger contracture
- Allows for less rehab time
- Improves compliance to splint wear
- Prevents recurrence of injury

Introduction:

RCL injury to index MP joint occurs mostly due to trauma or insidious due to arthritis resulting in pain in the MP joint of the index finger with pinch and grip. Chronic instability may lead to pain, weakness, and arthritis.⁵

The injury results in improper pinch patterns especially with patients suffering from arthritis, resulting in radial pinching of the thumb to the index finger rather than the normal pulp to pulp pinch. This further exaggerates the deformity. This pinch pattern hyper-pronates the index finger thus adding to the 1st CMC joint involvement.

Test: Level of injury is tested by flexing the MP joint in flexion and ulnarly deviating it, grades are defined as follows:

Grades: Grade 1 defined as (tenderness over RCL, no instability), grade 2 (laxity compared to the contra-lateral digit with a definite endpoint), or grade 3 (laxity without endpoint)¹. Early presentation is defined as less than four weeks and late greater than four weeks.¹

Traditional treatment included:

Casting, Buddy straps, Aluma-foam and if none of the conservative treatment² worked a surgical Repair/ Reconstruction or fusion is done.

Purpose of the orthosis

The purpose of this orthosis is to demonstrate a better approach to managing patient with RCL involvement of the index finger. Significant stresses are placed on the radial side of the MCP joint of the index finger.⁴ Where typical treatments have failed², this splint design offers new light to treating patients with this injury.

Reason for a new treatment approach

This splint allows for limited AROM in a protected position with improved compliance and minimal secondary problems.

The reason for a new approach to present a new option where previous choices have failed.

Grade I - if buddy strap is used, the Buddy straps pulls the index finger towards the middle finger causing it to ulnarly deviate thus exaggerating the problem and causing failure of treatment.

Grade II-III - Aluma foam or casting is used. Splint/ cast too bulky and prevents function resulting in poor compliance with splint wear, thus resulting in failure of treatment

Materials

- 2 pieces of low-temperature thermoplastic material Tailor Splint material to fabricate the cuff for Index and Middle finger. The width of the cuff is less than the length of P1
- 1 piece of thermoplastic rolled up and adjusted for insert to maintain correct distance

- Nail polish
- Self-bonding solvent

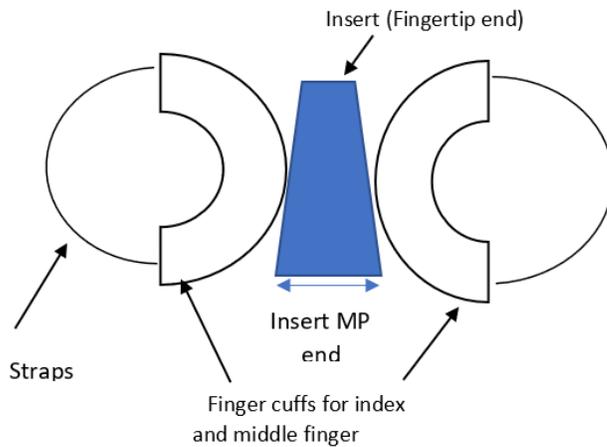


Figure 1

Fabrication Steps:

2 Cuffs are fabricated around the Index and Middle finger respectively by wrapping the thermoplastic around each finger and pinching the ends together, the ends of the cuff must be away from the ulnar aspect of middle and radial aspect of ring finger.



Figure 2

After the two cuffs are conformed around the finger, they are then opened, and the ends are cut to allow for changes in swelling by use of Velcro. An insert to encourage neutral positioning of the

index finger to its metacarpal is used. Solvent to remove any adhesive coating is applied to all materials. And the finger insert is then attached based on the angulation needed to keep the index finger in alignment to its metacarpal and prevent deviation of the finger. The two fingers



Figure 3

Figure 4

index and middle are then held together with the finger insert. The cuffs of the Wide buddy loop are adjustable to accommodate for the change in hand swelling after surgery. Nail paint is used at one end to remind the patient which way to wear the splint.

Wearing time:

Wearing the wide buddy loop prevents ulnar deviation of the index finger thus protecting the finger and preventing full flexion of the finger. [Click here](#) to see movement

Prevents stiffness of the MP joint due to the limited movement allowed. Thus, reducing the number of visits seen in therapy.

Results:

Grade I responds to the wide buddy loop treatment in around 3-4 weeks

Grade II and III 5-6 weeks, may require hand-based MP extension splinting at night for optimum results

Grade IV require surgical repair², patient is fitted with MP extension splint initially after surgery for 4 weeks at all times, then to wide buddy loop during the day and MP extension splint at night for another 2 weeks, finally the night splint is D/C'd and wide buddy loop is continued for another 2 weeks until patient demonstrates stable pinch patterns. Wide buddy loop splint encourages function yet protecting the repair, thus allowing early motion. If patient is involved in sports, taping is used. Once the repair is deemed stable to pinch and gripping activities the wide buddy loop is D/C'd.



Figure 5

Case example:

1st Pre-Op RCL injury

Pt. was a pro-tennis player, presented with RCL strain grade II on MRI³, secondary to incorrect taping of the wrist, which resulted in incorrect racquet handling, leading to strain of RCL of the index finger. This patient was treated with night MP blocking splint (hand based, IP's free) and a day wide buddy loop splint. Pt was taped during practice sessions and games to avoid ulnar deviation of the Index finger

Results: MRI³ was repeated after season was over, pt. presented with good healing and no pain and tenderness over RCL

2nd case: Post op repair of RCL 3 weeks post op.

Pt. had an old RCL strain due to previous injuries, resulting in pain on the radial aspect of the index finger. Pt. presented to the clinic 3 weeks post op with swollen stiff fingers, no movement at the MP joint and limited movement at the PIP and DIP joints.

This patient was splinted in the MP blocking splint for an additional 2 weeks but removed for gentle protected exercises (maintaining neutral position of the index finger during ROM). At 5 weeks, pt. was provided with a wide buddy loop during the day and the MP splint at night, to allow for early active ROM. Pt. was allowed to move it but not use it.

The blocking splint prevented full MP flexion thus preventing any loosening of the surgical repair. Pt. was instructed to use the MP splint during the day if he was in crowded places or where someone may accidentally shake his hand.

The night splint was D/C'd at 8 weeks along with the wide buddy loop, after ensuring stability of the repair & decrease in pain.

The wide buddy loop helped with reducing swelling by allowing early motion. It also helped prevent complications like stiffness due to extended casting or using regular buddy loops which doesn't protect the repair thus loosening the repair, resulting in pain and decreased pinch strength.

Exercises given to the post op patient were, peg rolls to enhance finger movement and putty rolling to ensure full MP/PIP extension. Once stable, strengthening exercises were added.

Results: Improved pinch strength with no pain, and enhanced function.

Supplemental data:

Benefits of Wide buddy loop

Easy to wear, allows enough movement to perform light functional activity, however, prevents complete flexion of the finger or a tight fist. Prevents ulnar deviation of the index finger thus protecting the injury and preventing it from worsening and allowing healing to occur. Recovery process is smooth due to full compliance from the patients on splint wear. Improved prehension pattern of the thumb and index finger

The two cases chosen to demonstrate typical outcomes of therapy following RCL pre/post op injury, all demonstrated improved PSFQ scores, decreased pain, and satisfaction with early motion.

Casting of the patient s/p surgery may result in contracture of the MP joint and allowing motion without proper support may result in loosening of the repair. Thus, minimal protected movement without excessive use prevents both the contracture of the finger and loosening of the repair.

The significance of this injury remains underestimated and requires a high index of suspicion.¹ Early correct splinting is crucial to successful treatment. For successful treatment compliance is

incredibly important. Its proven, bulky splints have reduced compliance as it inhibits function. Thus the wide buddy loop serves that gap and allows for successful conservative management of the RCL injury for grade I, II, III without surgery despite the length of the treatment and early motion protocol after surgery thus minimizing the risk of post op complication.

Excellent outcomes have been achieved using the protocol for pre/post op RCL injury. If the hand surgery involves multiple procedures at the same time, therapists should use clinical reasoning to ensure there are no contraindications for using the protocol described here. Future investigation is needed to determine the optimal number of treatment sessions, & to continue to monitor for adverse effects and attainment of functional goals.

References:

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