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

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Purpose

The purpose of this poster is to describe the development and implementation of an evidence-based pre and postoperative hand therapy treatment protocol for radial collateral ligament sprain (RCL) of the index finger using a custom fabricated wide buddy loop brace. Two case examples are described which demonstrate the typical outcomes with splint wear. This splint allows for AROM in a protected position with improved compliance and minimal secondary problems.

Background

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.
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 and ulnarly deviating it 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). Early presentation is defined as less than four weeks and late greater than four weeks.

TRADITIONAL TREATMENT INCLUDED
Casting, Buddy straps, Aluma-foam and if nothing worked a surgical Repair/ Reconstruction or fusion is done.

REASON FOR A NEW TREATMENT APPROACH
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

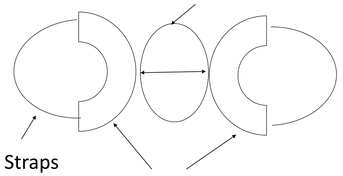
Method

Therapists at our facility searched PubMed and related databases for information regarding pre and postoperative precautions and therapy protocols for index RCL injury treatment. Utilizing the limited research available for this treatment and postoperative protocols the therapists at Hands-On-Care developed therapy guidelines for the management of RCL injuries pre/post op. The outcome measures used to evaluate treatment effectiveness were pre and post operative Patient Specific Functional Questionnaire (PSFQ) scores, complications, and pain.

Splint Design

2 cuffs the width of P1 of the fingers
A finger insert to encourage neutral positioning of the index finger to its metacarpal
The two fingers index and middle are held together with the finger insert

WIDE BUDDY LOOP SPLINT PATTERN



Finger cuffs for index and middle finger

Benefits of Wide Buddy Loop splint design

- Wearing the wide buddy loop prevents ulnar deviation of the index finger thus protecting the finger and preventing full flexion of the finger.
- Prevents stiffness of the MP joint due to the limited movement allowed by the splint.
- Thus reducing the number of visits seen in therapy
- Results: Grade I responds in 3 weeks,
- Grade II and III 5-6 weeks, may require hand based MP extension splinting at night for optimum results
- Grade IV require surgical repair, pt is fitted with MP extension splint initially, however as the splint is weaned, it is weaned to a wide buddy loop splint encouraging function yet protecting the repair, thus allowing early motion.
- The cuffs of the Wide buddy loop are adjustable to accommodate for the change in hand swelling after surgery.
- Once the repair is deemed stable to pinch and griping activities the wide buddy loop is D/C'd.
- Repairs are treated in MP extension splint 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. If patient is involved in sports, taping is used.

Case Studies

We present here with 2 cases

1st Pre-Op RCL injury

Pt. was a pro-tennis player, presented with RCL strain grade II on MRI, 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: MRI 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 accidently 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 surgery, 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 started.

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

Note: These two cases were 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.

Benefits of Wide Buddy Loop

- Easy to wear
- Allows enough movement to perform light functional activity,
- Prevents complete flexion of the finger or a tight fist
- Prevents ulnar deviation of the index finger thus protecting the injury 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

***Note:* Casting of the patient s/p surgery may results 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.**

Discussion & Recommendations

The significance of this injury remains underestimated and requires a high index of suspicion. Early correct splinting is crucial to successful treatment. For successful treatment compliance is highly important. It is proven that bulky splints have reduced compliance as they inhibit 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 this 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, and to continue to monitor for adverse effects and attainment of functional goals.

References

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