Early motion or immobilisation of Hand Fractures?

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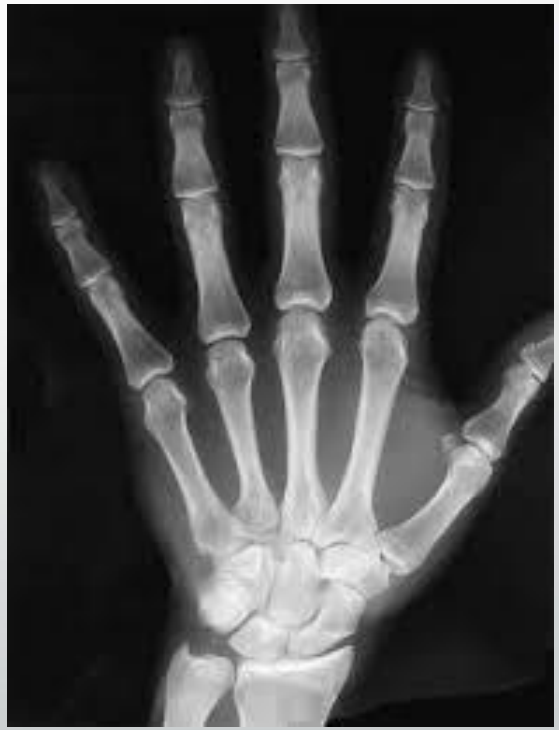
Hand Fractures (distal to carpus)

- Soft tissue injury with an underlying bone injury (Haughton et al. 2012)
- Soft tissue injury often takes much longer to heal than the bone injury

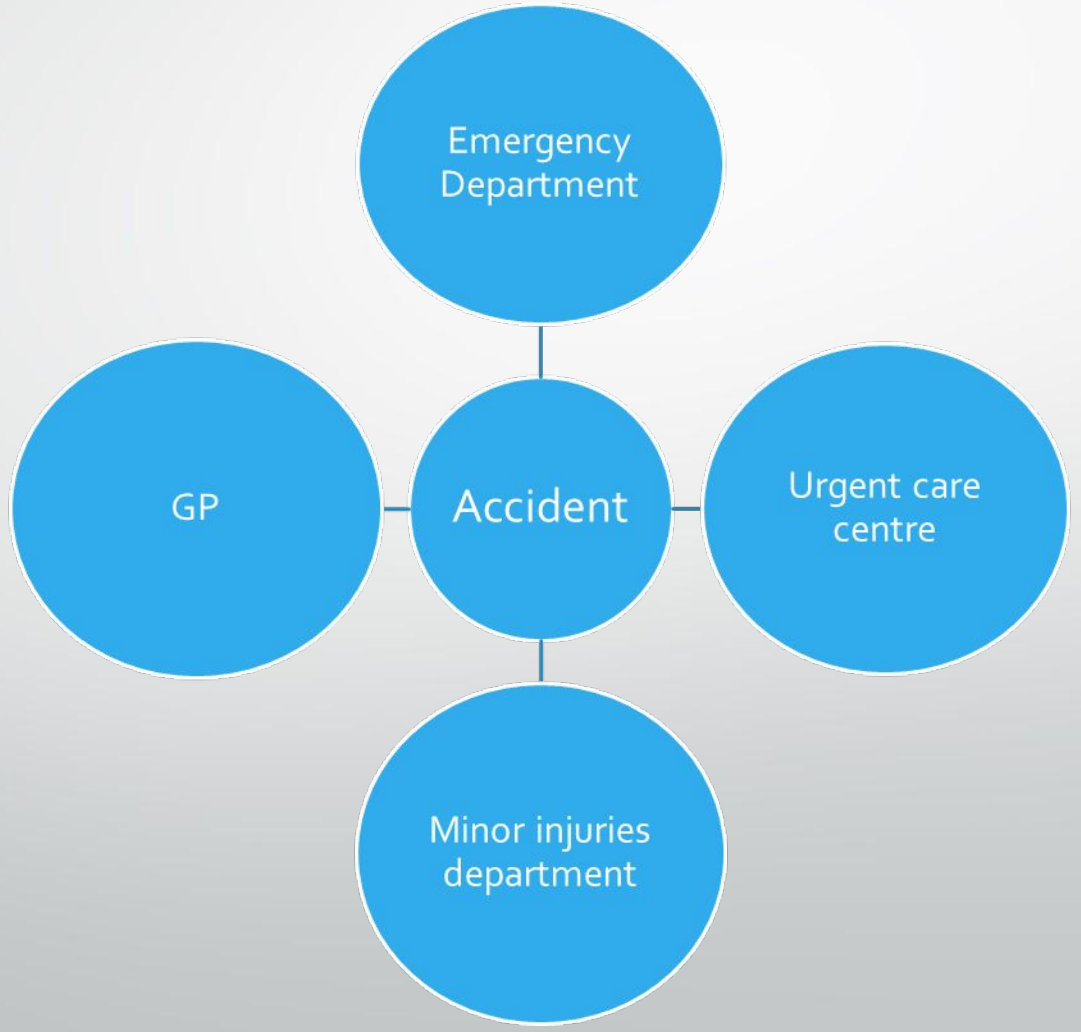


Who are our main clients?

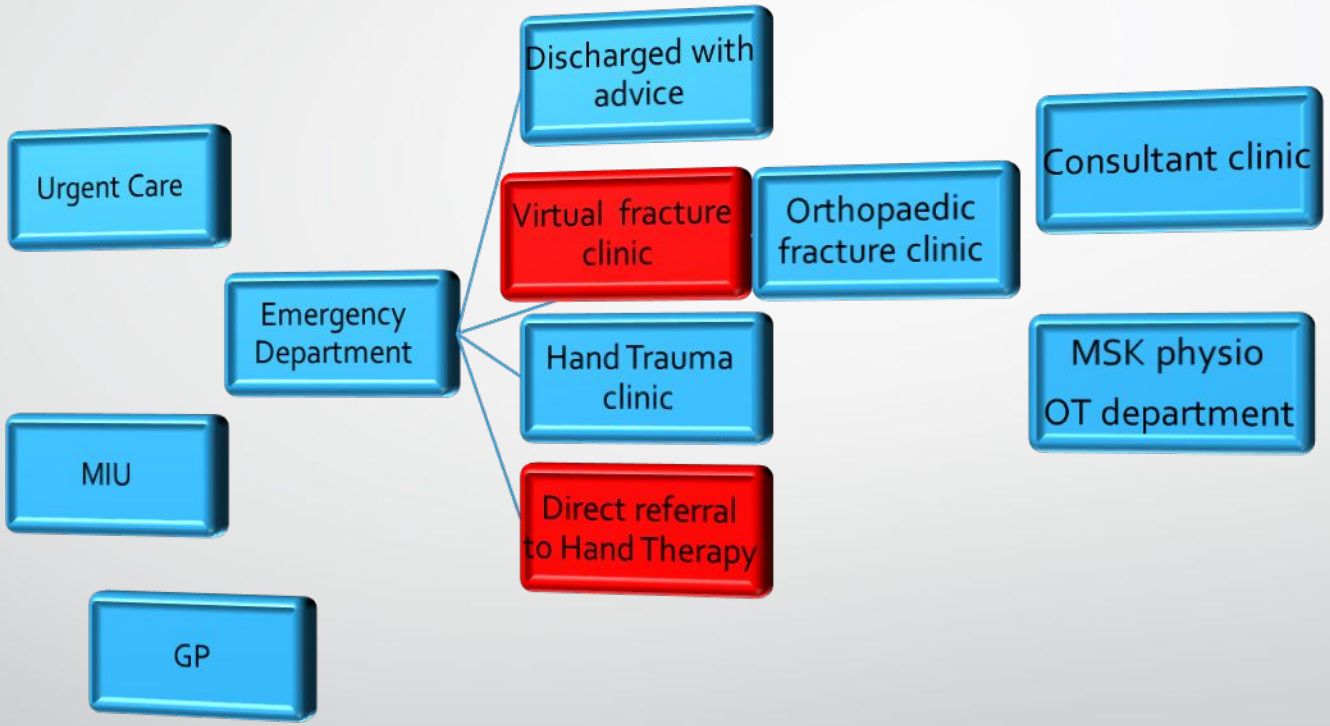
What do they want?

- Prompt intervention and effective pathway of care
- Accurate diagnosis and explanation of options
- Prompt and effective treatment
- As few appointments as possible
- Restoration of normal motion/function
- Return to activities in the shortest possible time

Options after Hand Fracture



Pathway of care / Where next?



Is surgical intervention necessary for hand fractures?

- 95% of hand fractures are closed
- Surgeon needs to be very confident that they can improve the fracture stability and final outcome before a closed fracture is turned into an open fracture
- Patients often believe that having surgery will help the fracture heal and become stronger quicker leading to a faster return to function/ work
- Surgery ONLY done to avoid tendon/muscle imbalance and excess scissoring/rotation rather than anatomical reduction of fragments (Sammer et al. 2013)

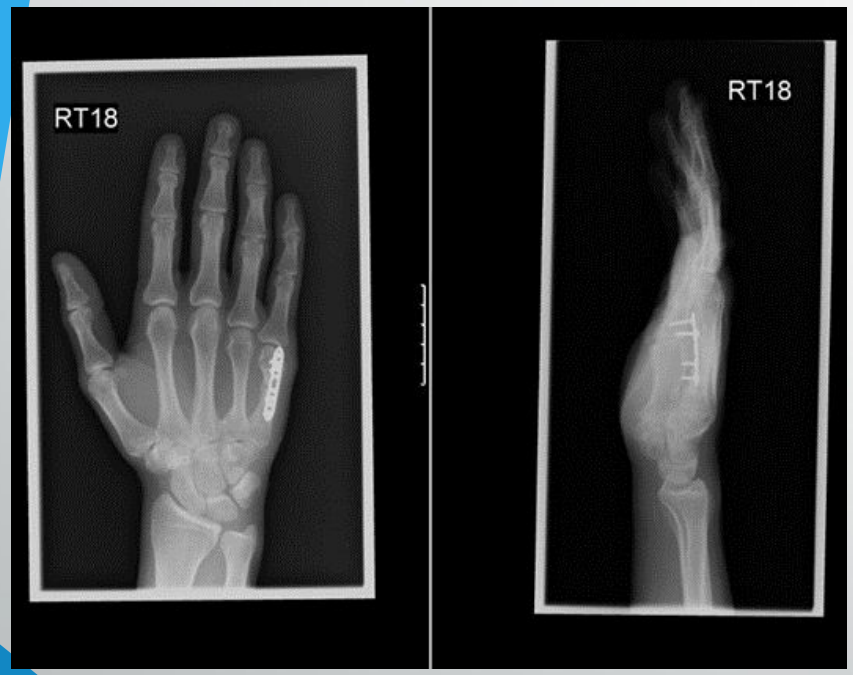
Good decision making

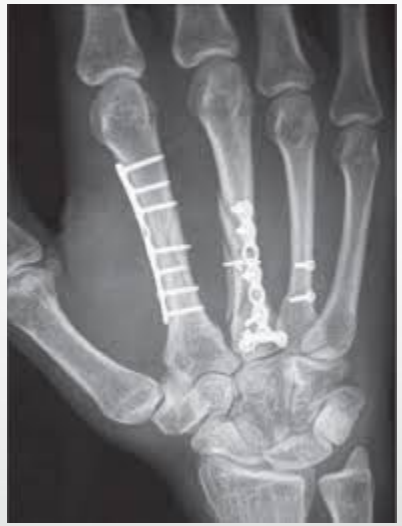
- Treat patient and the clinical signs **not** the X ray.
- If the digit has 'functional stability' the patient will be able to flex the finger over 30 % of the normal joints range of motion
- Points to help decision making:
  - Malrotation following spiral metacarpal fractures almost always corrects with effective buddy taping and finger flexion. (Giddins 2016)
  - Metacarpal shortening of 10mm affects interosseous function and may reduce grip by 55% (Haughton et al. 2012)
  - Less than 1mm of articular joint step is acceptable (Sammer et al. 2013)
  - Less than 45% articular surface fracture is acceptable (Sammer et al. 2013)

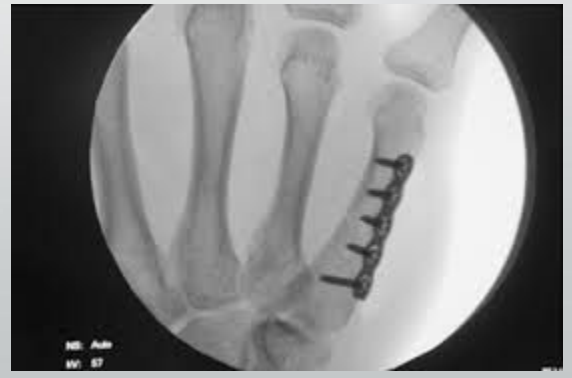
- LaStayo et al. (2003) discussed the main benefit of surgical repair is the ability to encourage immediate mobilisation. Therapists are happy!

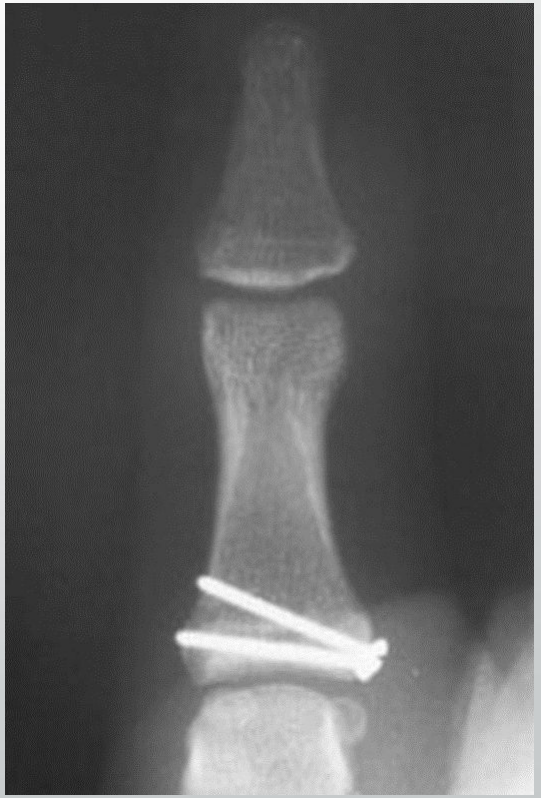
- Children with hand fractures rarely require surgical intervention beyond MUA. Can rest a child's hand in a good positive without fear of complications

Why do we still immobilise these patients for 2/3 weeks post operation?









What do we mean by Early Motion?

- Most literature on hand fracture surgery and rehabilitation now state they use early motion rather than immobilisation
- Very few articles state what this actually means and when this starts.
- Strickland et al. (1982) stated motion should occur before 4 weeks post injury/ surgery. Is this early motion?

What does early motion mean in your service?

When do you mobilise a stable /surgically repaired and unstable fracture?

3-5 Days post injury/MUA/surgery . Acute inflammation/Oedema settling

1 week post injury/MUA/surgery . Protected tendon glide without excessive motion can improve blood flow to enhance fracture healing

2 weeks post injury/MUA/surgery Clinical signs of bone union. Tethering of soft tissues can already be a concern.

3-4 weeks post injury/MUA/surgery Callus formation but not often seen on X ray.

The Early motion 'Gray- Zone'

Feehan (2003)

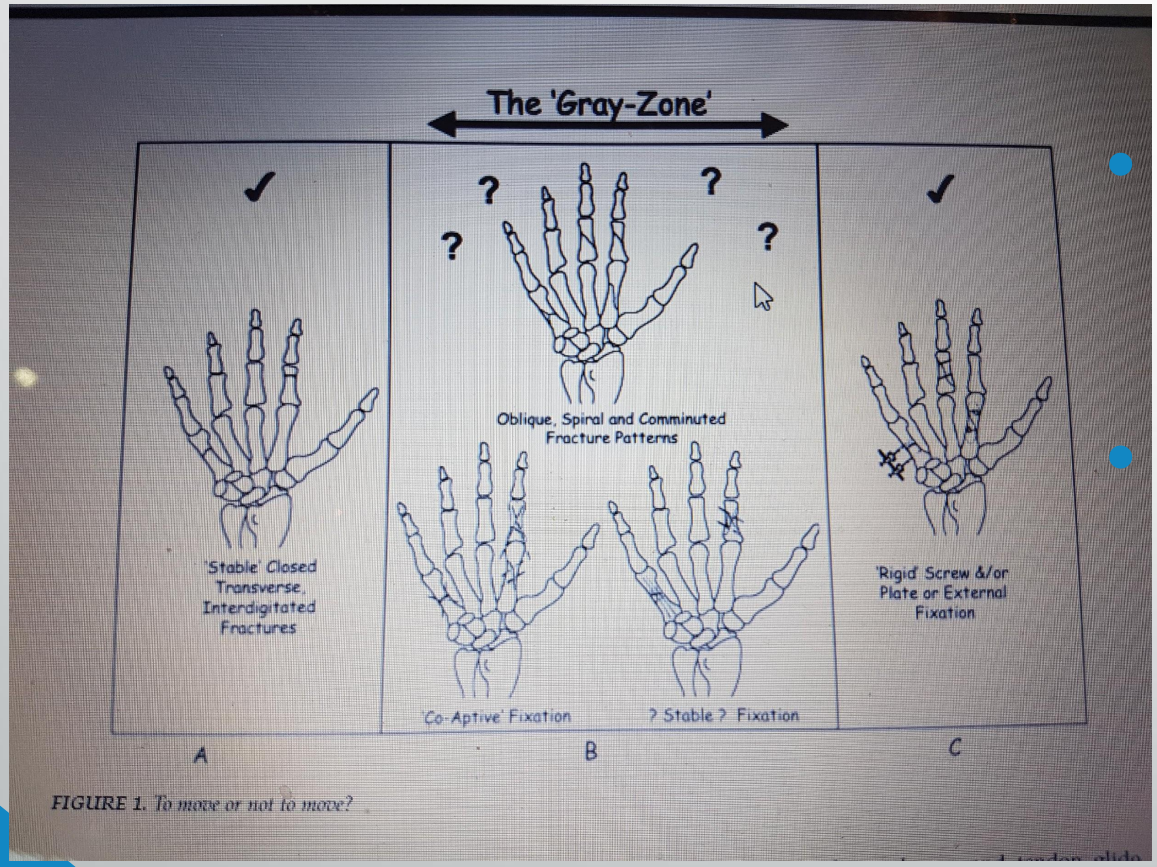


FIGURE 1. To move or not to move?

- Fractures types either side of the 'Gray zone' must move early without restriction
- Fractures in the 'Gray Zone' can move early with carefully considered motion and splints.

Types of early motion discussed in literature

- Early protected motion (within the protection of a splint)
- Early controlled motion (control of range of motion completed)
- Early tendon gliding exercises
- Individual joint mobility exercises

Early motion principles

- Early motion should be gentle, never painful ,progressive ,initially supervised with full co operation of the patient (Tubiana 1983)

- Goal of early motion is to protect and maintain the integrity of the fracture reduction during the healing process. Use techniques of protective support and early controlled motion which allow safe, pain free , progressive motion (Feehan 2003)

- Therapists can positively influence bone consolidation by the application of controlled stress and avoidance of excessive stress across the healing fracture site. (La Stayo et al.2003)
- The most influential outcome affecting clinical outcome post fracture healing is whether the soft tissue is gliding normally
- Therapists should and can provide an evidenced based rehabilitation pathway for each type and site of hand fracture.
- Toeman and Midgley (2010) provided pathway for MC fractures with different splints/protection times

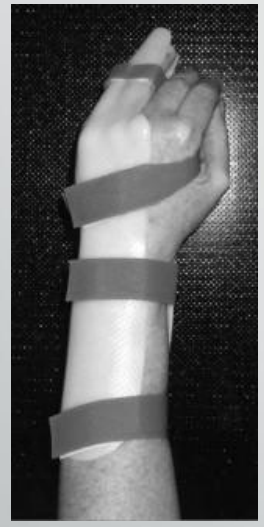
Early aims of fracture therapy

- Early referral and intervention
- Education/advice
- Protect healing fracture from excessive stress on healing bone
- Oedema control/ pain control
- Tendon gliding / tissue extensibility exercises
- Controlled mobilisation of joints around the fracture
- Continue to improve ROM as pain/tenderness allows

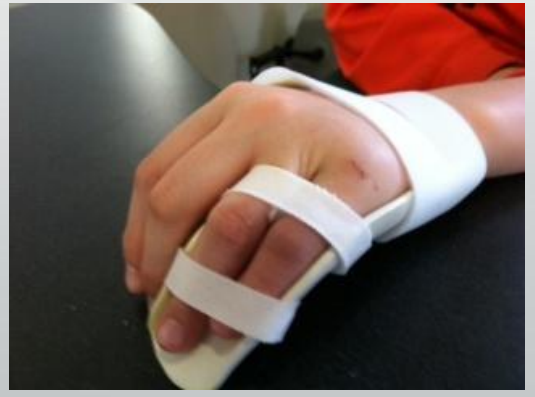
Monitor carefully for complications and stop them occurring

Buddy taping important

Functional Positional Splinting



Protection splints

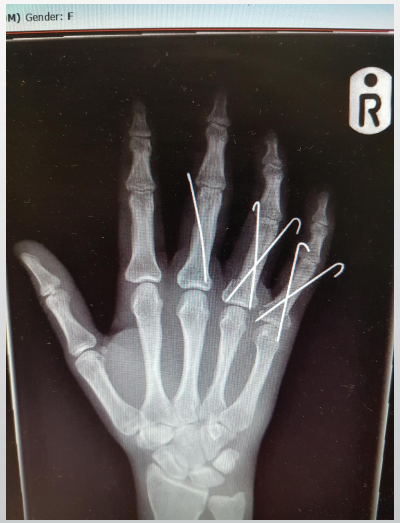


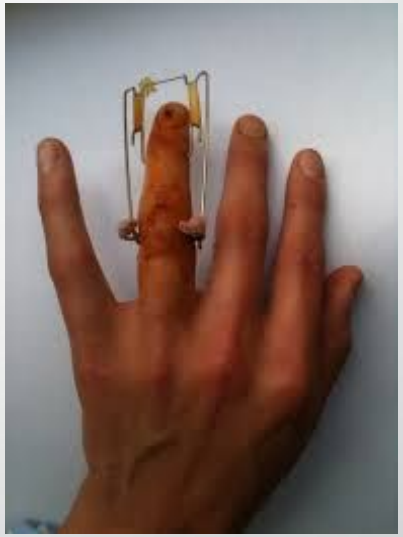
Fracture bracing splints

Early protected motion 2-4 days post K wires

Gregory et al.(2014)

Lalonde (2015)





When we don’t want to mobilise a specific joint

Concerns

Surgeons concerns

- Mal Union
- Non Union (rare)
- Osteoarthritis ?
- STIFFNESS
- CRPS

Therapists concerns

- Oedema
- Scar tethering
- Reduced tendon gliding
- Extension lag or FFD
- Scissoring
- Reduced mass flexion
- Grip

Patients concerns

- Finger still swollen
- Finger still tight especially am
- When can I RTW
- When can I play sport
- Grip strength reduced
- Cosmesis

Effective pathway of care really important

- Hand fractures can be complicated by:
  - deformity from no treatment
  - stiffness from over treatment
  - deformity and stiffness from poor treatment (Swanson 1970)
- For every non union the hand surgeon would see a thousand stiff joints (Sammer et al.2013)

Thoughts on pathway of care

- Do surgeons really need to assess the stable hand fractures and STI to establish diagnosis and treatment?
- Do surgeons really need to see their post op patients in clinic before therapy can start?
- Can MIU/ Emergency doctors refer directly to the therapists?
- How can the pathway of care in your Trust be improved to allow early therapy?

MVH Hand Therapy led Hand Trauma Service

- ESP Hand Therapist replaced the Registrar in October 2013
- MIU specialist nurses in peripheral service refer directly to this clinic
- Guidelines provided on what to refer and what needed to be referred to Hand trauma clinic regional centre for surgery
- Patients seen within week of visit to MIU
- ESP therapist assessors and treats during appointment
  - Refer to hand therapy for rehabilitation as needed
  - Refer to Hand Trauma clinic if complications
  - Refer to Consultant hand therapist clinic or Hand surgeon clinic if required

Guidelines

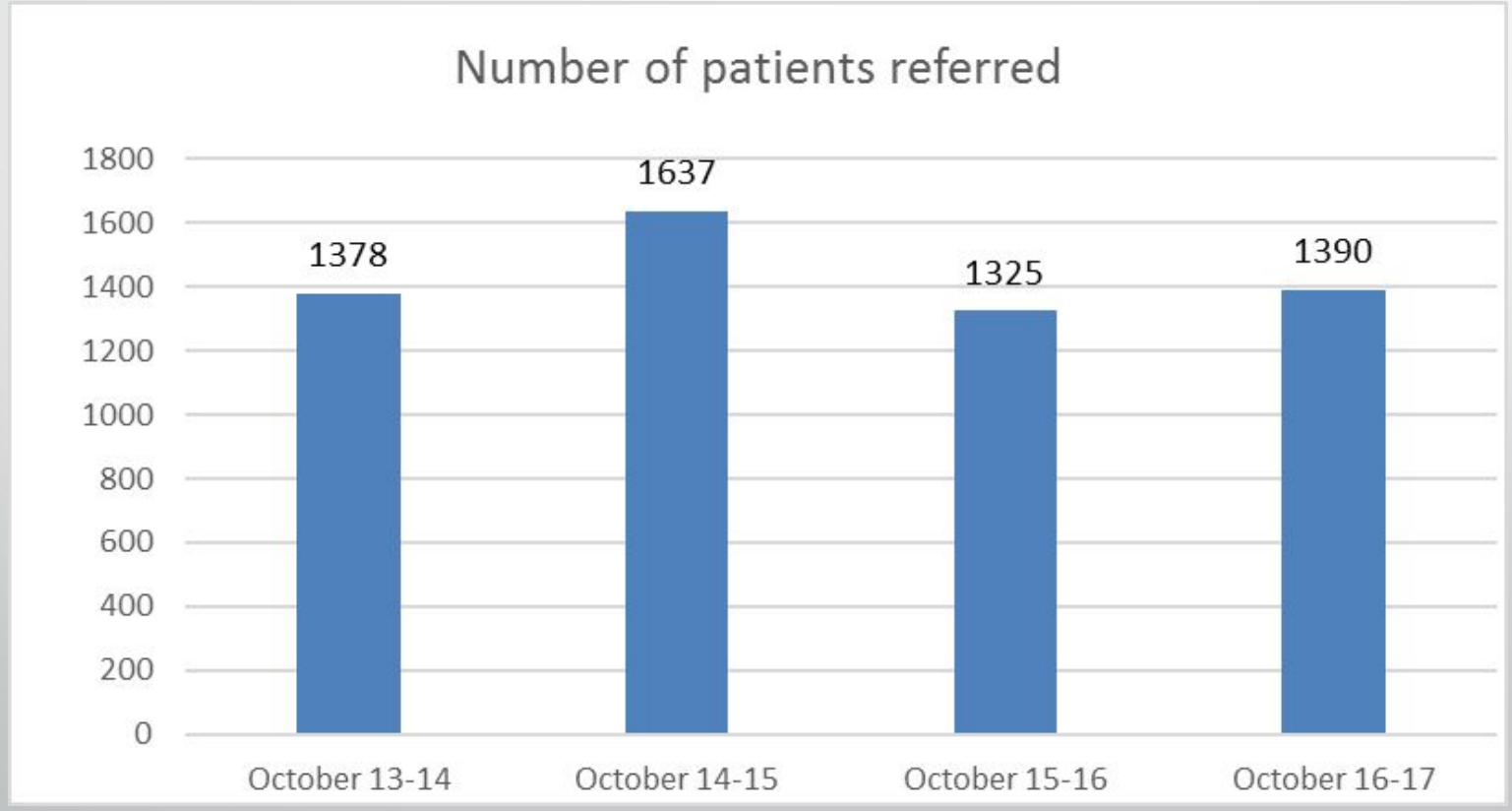
Acceptable in ESP hand clinic

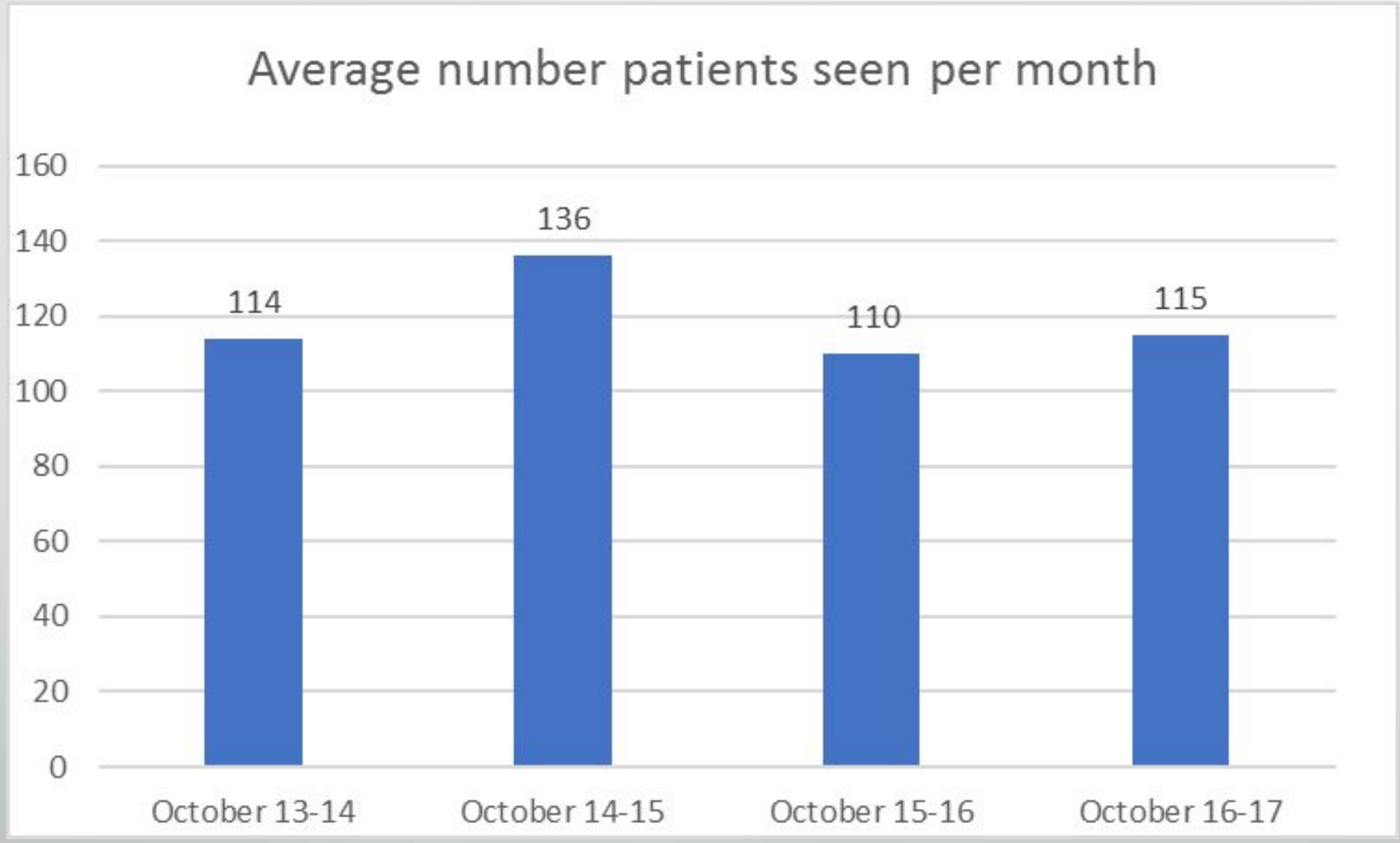
- Adults and Paediatrics
- All closed fractures
  - MC/PP/MP/DP
- Soft tissue injuries
- Dislocations which have been easily relocated
- Mallet injuries

Not to be seen

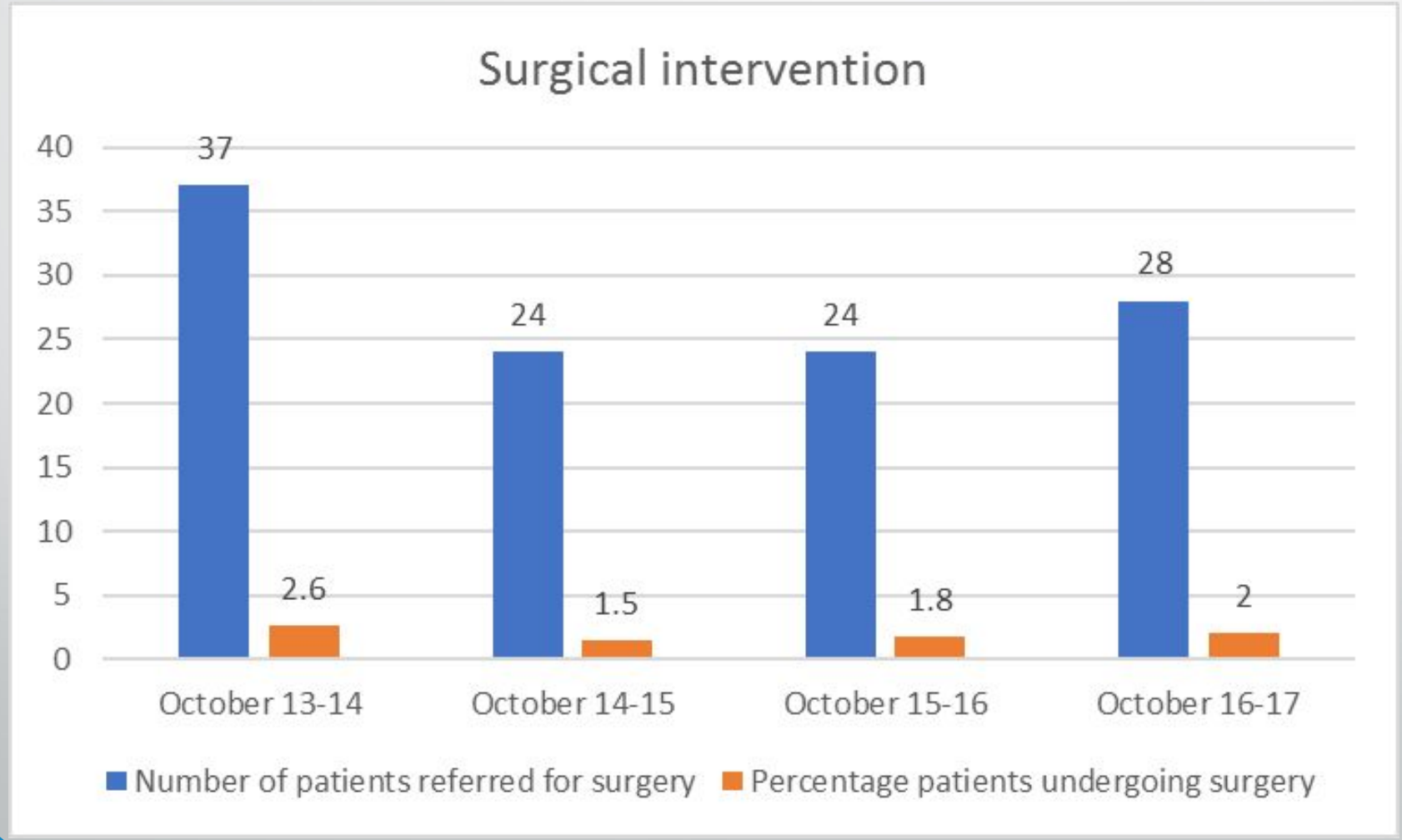
- Open wounds
- Grossly displaced fractures which obviously require intervention
- Nail bed injuries

Clinic runs 3 days per week with capacity of 10 new patients per clinic . Extra capacity found in busy periods




Average number patients seen per month
160
140
120
100
80
60
40
20
0
114
136
110
115
October 13-14
October 14-15
October 15-16
October 16-17

Where the referrals appropriate?



Outcomes

- Patient outcomes excellent despite never seeing a Doctor
- Average new to follow up ratio 1:2.7
- Friends and family review excellent. 98% reporting they would be extremely likely or likely to recommend our service
- Many siblings seen in clinic over the years and many patients come on recommendation
- Patient experience questionnaire very positive 2015/2016
- Final outcomes audited yearly

Overall closing thoughts

- Experienced Hand therapists can independently assess and treat closed fractures effectively within a timely framework
- Therapists can make excellent splints which protect potentially unstable fractures whilst early motion commenced
- Therapists can do dressings so can see post operative fractures early
- Please review your pathway of care to allow:
  - Less hospitals visits for patients before diagnosis and effective intervention
  - Less overall clinic appointments after intervention decided
  - Early motion essential ESPECIALLY post fracture fixation
  - Fewer complications and good outcomes
  - PS. Regular CRPS and hand stiffness seen within a service may indicate a failure in the

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