Splints for paediatric buckle fractures – a Quality Improvement Journey

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Patient story
An 8 year old girl attends the Emergency Department (ED) after a fall. She is put in a plaster cast (POP) for a distal dorsal buckle fracture of her wrist. Her mum is concerned as she will not be able to apply the creams that help with her daughter's severe eczema.

Question: Is there an alternative?
Answer: A literature review and local/national practice says YES!

Aim
To develop a pathway that uses splints for distal dorsal buckle fractures in children that is safe, acceptable to patients/parents and cost effective.

Methods
- Literature review and review of local/national practice
- Driver diagram to identify primary and secondary drivers, outcomes and balancing measures
- Stake holder analysis and change matrix to identify the multidisciplinary team
- Process mapping
- Multiple PDSA cycles including questionnaires, local feedback, pathway development and simulated testing, departmental teaching, and audit of implemented pathway

Outcomes
- Preference: 84% (11/13) of patients/parents asked would be happy for a splint.
- Pathway/patient information leaflet developed after multiple PDSA cycles
- Pathway use during the first two months revealed:
  - 27 buckle fractures of which 14 were suitable for the pathway
  - Of those suitable, 9 (64%) were put on the pathway with 2 of the 5 that were not having valid reasons documented
- Balancing measures
  - No returns to ED with problems
  - 5 volar fractures, 1 was inappropriately managed with a splint. Delay in identification due to failure of safety net system, unlikely to be any long term consequences

Conclusions
- Patients/parents appear happy to have these fractures managed with splints
- When used the pathway appears to be largely successful:
  - Freeing up fracture clinic appointments,
  - Potential time savings in the department for patients/parents and medical/nursing staff,
  - An approximate £50 saving for every splinted patient

Areas for development
- Improve uptake of the pathway through further staff education
- Follow up questionnaire to formally assess the patient/parent experience
- Further PDSA cycles to ensure quality control of the pathway

Reflection on the journey
- Implementation of a quality improvement project is fraught with hurdles that need perseverance and a multi-disciplinary approach to overcome

Distal DORSAL forearm buckle fracture pathway

<table>
<thead>
<tr>
<th>Decision Point</th>
<th>Pathway/Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the fracture in the distal 1/3 of the forearm?</td>
<td>No → Go to other fracture type (both proximal and distal)</td>
</tr>
<tr>
<td>Is the fracture a buckle fracture?</td>
<td>Yes → Go to Step 2, No → Continue with POP and fracture clinic</td>
</tr>
<tr>
<td>Is the fracture on the left hand?</td>
<td>Yes → Skip to Step 4, No → Continue with Step 3</td>
</tr>
<tr>
<td>Is the fracture on the right hand?</td>
<td>Yes → Skip to Step 4, No → Continue with Step 3</td>
</tr>
<tr>
<td>Will they require a splint?</td>
<td>Yes → Go to Step 5, No → Continue with POP and fracture clinic</td>
</tr>
<tr>
<td>Select not suitable: Discuss with senior regarding whether orthopaedic opinion needed or POP and fracture clinic is appropriate</td>
<td></td>
</tr>
<tr>
<td>Split not available: Discuss with senior regarding whether orthopaedic opinion needed or POP and fracture clinic is appropriate</td>
<td></td>
</tr>
<tr>
<td>Insert splint: Discuss with senior regarding whether orthopaedic opinion needed or POP and fracture clinic is appropriate</td>
<td></td>
</tr>
<tr>
<td>Dorsal angulation less than 45° or no dorsal step-off with a senior</td>
<td>Yes → Skip to Step 4, No → Continue with Step 3</td>
</tr>
<tr>
<td>Other fracture type: Complete, greenstick or fracture of radius (EDR)</td>
<td>Go to Step 4</td>
</tr>
<tr>
<td>Volar buckle: Unsuitable for splint due to risk of slip</td>
<td>POP and fracture clinic</td>
</tr>
<tr>
<td>Dorsal angulation greater than 45° or dorsal step-off with a senior</td>
<td>No → Continue with Step 3</td>
</tr>
<tr>
<td>Will they require a splint?</td>
<td>Yes → Go to Step 5, No → Continue with POP and fracture clinic</td>
</tr>
<tr>
<td>Apply splint: Discuss with senior regarding whether orthopaedic opinion needed or POP and fracture clinic is appropriate</td>
<td></td>
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</tbody>
</table>

References

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