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ORIGINAL STUDY

Virtual fracture clinic-two year follow up of paediatric patients directly discharged from emergency department with orthopaedic injuries

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The Trauma Assessment Clinic (TTAC) has been in existence since 2016. TRH serves a population across of approximately 292,000. The patient service provided by the TTAC aims to promote patient self-care of certain fracture patterns. The focus of this review was the discharge of two paediatric fractures : clavicular fractures and radial buckle fractures.

We reviewed all paediatric patients referred to the consultant-led virtual fracture clinic over a six-month period between 2015/2016. The patient group for this study was contacted two years following their initial injury. Thirty-nine patients were identified fitting the TTAC criteria. Parents of all these patients were surveyed in relation to their satisfaction with the TTAC. Thirty parents (30) completed the telephone survey.

Twenty-one parents (70%) advised that they would have had to organise childcare to care for other children and twenty-six parents (87%) stated that they would need time off from work to attend the out-patient department. No parents surveyed brought their children to ED or to their General Practitioner (GP) during the treatment after injury. Twelve parents (40%) either strongly agreed (11) or agreed (1) that they would have preferred a face-to-face appointment.

Discharge of patients by the TTAC using VFC protocols results in high levels of patient and parent satisfaction. A significant number of parents (40%) expressed a preference for a face-to face consultation. TTAC should expand the service but should instigate education sessions within the hospital group and increase public awareness of VFC principles.

Keywords : Clinic ; trauma assessment clinic.

INTRODUCTION

The Trauma Assessment Clinic (TTAC) has been in existence since 2016. TRH serves a population across four counties of approximately 292,000 with one level two hospital and two level three hospitals. Between five to six thousand new fracture clinic referrals are seen in fracture clinic on an annual basis in TRH. The patient service provided by the TTAC aims to promote patient self-care of certain fracture

No benefits or funds were received in support of this study.

The authors report no conflict of interests.

Ethical Standards : This review followed ethical standards in accordance with the revised Helsinki Deceleration 2008. Informed verbal consent was obtained from all patients (parents) included in this study.

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patterns thereby improving patient satisfaction and improving efficiency in the out-patient department. The service is modelled on the Glasgow Virtual Fracture Clinic which has as well-established virtual fracture clinic protocol *(1-6)*. The Glasgow group ensure that patients referred after injury follow an efficient patient-centred pathway that eliminates unnecessary and untimely appointments. The Emergency Department (ED) in TRH worked in tandem with the TTAC to allow direct discharge of minor stable factures. Whilst the stable fracture patterns reviewed in ED included radial head, extra-articular 5th metacarpal and 5th metatarsal fractures, the focus of this review was the discharge of two paediatric fractures : clavicular fractures and radial buckle fractures.

Radial buckle fractures are also termed 'torus' fractures. Buckle fractures occur due to trabecular bone compression from axial loading force along the long axis. They are incomplete fractures that will occur on one cortex of the bone i.e. the compression side of fracture and respond well to treatment in splints rather than casts *(7-10)*. Clavicular fractures in children can occur due to a fall on an outstretched arm or direct trauma to lateral aspect of the shoulder. Displacement can occur due to sternocleidomastoid and pectoralis muscle pull. The only clavicular fracture patterns included in this study were un-displaced fractures (less than 1cm), minor angulation (less than 10 degrees), middle third fractures and fractures with minor displacement. These criteria for clavicular fractures will allow for most of the periosteum sleeve to be intact. Non-operative management of paediatric clavicular fractures is a well establish method of treatment (*11,12)*. Minimal use of radiographs and a limited number of follow up appointments is also advocated *(13)*. Rate of non-union of midshaft un-displaced paediatric clavicular is minimal *(14)*.

The aims of this study were two-fold :

1. Identify the number of paediatric buckle fractures and clavicular fractures attending TTAC service.
2. Assess satisfaction levels amongst parents following the introduction of the TTAC.

PATIENTS AND METHODS

The focus of this review was the direct discharge of two paediatric fractures : clavicular fractures and radial buckle fractures. We reviewed all paediatric patients referred to the consultant-led virtual fracture clinic over a six-month period between 2015/2016. We identified 39 patients that were referred and managed from ED in accordance with our direct discharge VFC policy. An advice sheet was given to each patient/parent in the Emergency Department (ED) and a phone call was subsequently made to a parent, within forty-eight hours from injury, to ensure adequate treatment was being provided. Only patients attending at TRH were included in this review. Referrals for paediatric cases from the peripheral units in our catchment area were not included in this review.

The patient group for this study was contacted two years following their initial injury. A total of 1,987 fracture cases were referred to the orthopaedic service across the region during the six-month timeframe from December 2015 and May 2016. 287 paediatric fractures were referred to fracture clinics during this period. Paediatric referrals from the peripheral hospitals in the region were not included

Did you receive an information leaflet in the Emergency Department in relation to your injury?
Was the information received in the Emergency Department regarding our service satisfactory?
If you had to attend a follow up clinic with your child, would you or your partner have had to organise childcare for other children in your family?
If you had to attend a follow up clinic with your child, would you or your partner have had to take time of work?
Was the information received in the telephone call from our team adequate?
Was it clear that our service could be accessed directly if you had any difficulties during the time your injury was healing?
Were you aware that there was a helpline number to ring if your encountered problems?
Did your child have to attend your GP/Emergency Department again due to his/her injury?
Are you satisfied with your child's recovery from your injury?
Would you have preferred to attend a clinic appointment for your child rather than the phone consultation?

Figure 1. — Tullamore trauma assessment clinic-patient satisfaction survey.

in this study. Paediatric cases were deemed to be any patients under the age of sixteen years of age at time of injury. Thirty-nine patients were identified fitting the TTAC criteria applied for buckle and clavicular fracture. Parents of all these patients were asked whether information was provided to patients and their families in ED. They were also asked whether parents were satisfied with the recovery from injury and whether patients had to attend their GP or return to clinic/ED (Figure 1.). Satisfaction was determined using the a five-part Likert scale, a scale which is well established in trauma and orthopaedic surgery as a measurement tool of surgical outcome and satisfaction *(15,16)*. All parents were contacted by phone. Thirty parents (n=30) completed the telephone survey.

RESULTS

The average age of those patients with buckle fractures was 10.6 years. The average age of those patients with clavicular fractures reviewed as part of this review was 5.6 years.

Twenty parents (66%) recalled receiving information leaflet. Four stated they did not receive information leaflets whilst six could not recall receiving the information leaflet.

Twenty-seven parents (90%) strongly agreed or agreed that they had received adequate information. One patient did not feel they had received adequate information in ED and one patient neither agreed or disagreed on the information provided to them was adequate.

Twenty-one parents (70%) advised that they would have had to organise childcare to mind other children if they had to attend TTAC. Nine families would not have required further childcare cover. Twenty-six parents (87%) stated that they would need time off from work to attend OPD. Four families stated they would not need time off work.

Twenty-parents (70%) strongly agreed or agreed they had received adequate information. Two parents could neither agree or disagree that they had received satisfactory information.

Twenty-four parents (80%) strongly agreed (6) or agreed (18) that they were aware that could contact service directly if any problems arose. Three parents neither agreed or disagreed that they knew they could contact TTAC. Three parents disagreed that they knew about potential early follow dates in TTAC after injury. Half of all patients (50%) reviewed stated they did not know that a mobile phone helpline number could be used as means of direct with TTAC. No parents surveyed brought their children to ED or to their General Practitioner (GP) during the treatment after injury with all parents agreeing or strongly agreeing that recovery was satisfactory.

Twelve parents (40%) either strongly agreed (11) or agreed (1) that they would have preferred a face-to-face appointment. One patient could not agree or disagree that they would have preferred an appointment. Eleven parents disagreed that they needed a face-to-face appointment while six parents strongly disagreed they needed a face-to-face appointment (Figures 2-5).

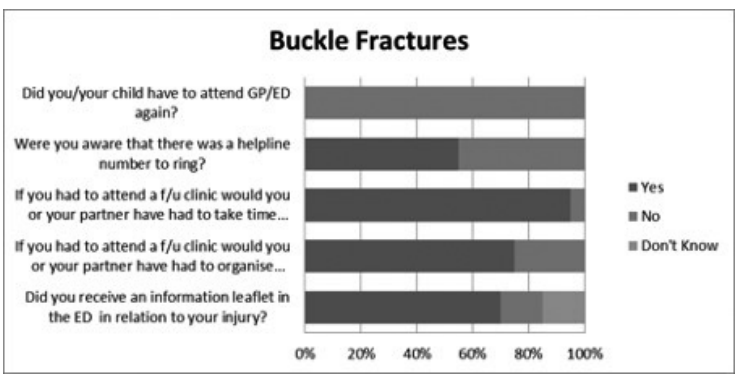

Figure 2. — Buckle fracture survey responses.

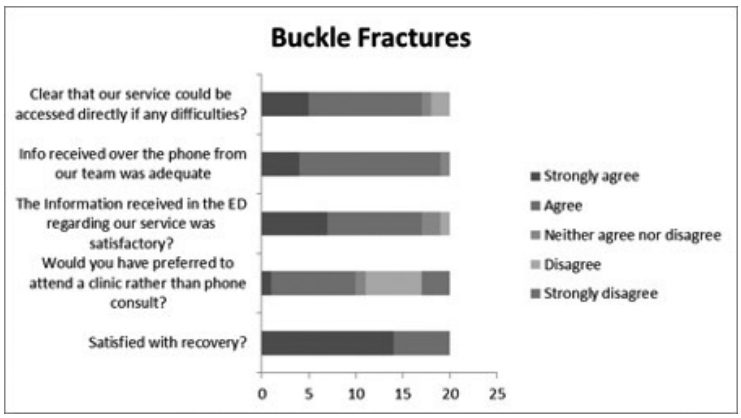

Figure 3. — Buckle fracture survey responses (continued).

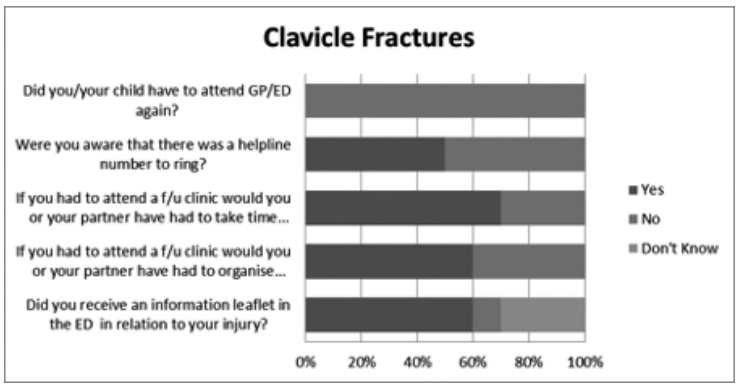

Figure 4. — Clavicular fracture survey responses.

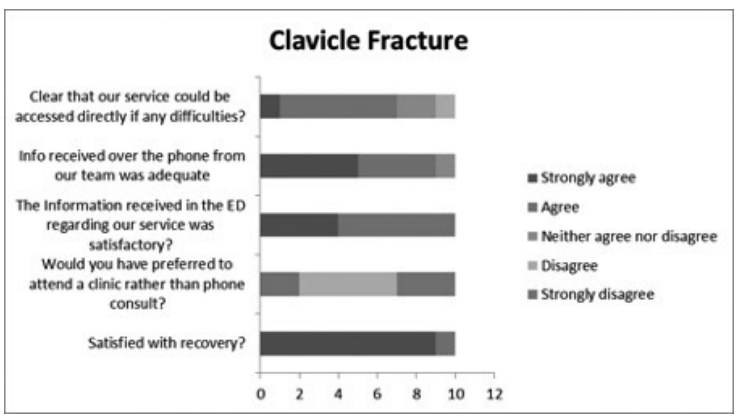

Figure 5. — Clavicular fracture survey responses (continued).

Parental responses were noted for both groups (buckle and clavicular groups) and the results were compared. There was little disparity amongst the responses amongst both groups. However, the buckle group did reveal more parents seeking a face-to-face appointment (Figure 6). Ten parents (50%) of the twenty buckle fractures reviewed strongly agreed or agreed that they would have preferred

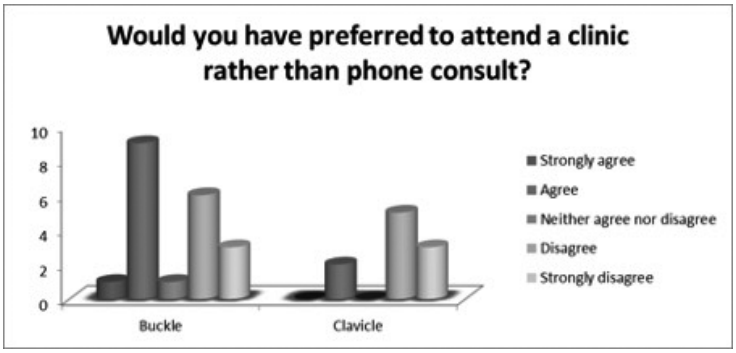

Figure 6. — Preference for clinic appointment

a face-to-face appointment. Only two of the ten clavicular parents indicated a wish for a face-to-face appointment.

DISCUSSION

This review took place during the first six months of TTAC. The unit delivered many workshops and tutorial sessions in relation to the concept of VFCs. 39 patients were identified as being suitable for review. 30 parents completed the telephone survey. The clinical protocol established by the Glasgow VFC *(6)* is specific in relation to buckle and clavicular fractures. The TTAC adopted conservative criteria in relation to VFC management of clavicular fractures. This may explain low numbers suitable for review. Despite widespread information dissemination in ED workshops and tutorials patients were not treated as per TTAC protocols. A number of patients with buckle fractures were fitted in half-casts and casts rather than removable splints. This led to unnecessary return visits to our clinic. These patients were unsuitable for telephone survey as part of this review as they required several visits to the hospital rather than just one visit to ED. A total of 297 paediatric fractures were identified across the catchment area (TRH with referrals from two peripheral hospitals) during this period. While only referrals from TRH were considered for this review there are obviously further paediatric fractures in the region that could be assessed by TTAC/VFC protocols.

The focus of this review was to assess patient and principally parental satisfaction with the TTAC. Formal clinical assessment took place in Emergency Department only. No formal clinical assessment took place following this initial assessment. Due to the stable fracture patterns we assessed poor clinical outcome is unlikely *(11)*. Parents were asked 'were they satisfied with the outcome from injury'. With so many of the parents reporting high satisfaction levels(figure) we conclude that patients have made a successful clinical recovery. No patient in either the buckle group or the clavicular group attended ED or their GP during recovery from their injury. No parents reported any delayed return to activities or sports.

The TTAC has evolved its service since this review took place. The Glasgow VFC protocols *(1-6)* have been used to establish the TTAC. There are now an increased number of physiotherapists working as part of the multidisciplinary team within the TTAC. The physiotherapists will often see patients directly if a soft tissue injury is suspected rather than a fracture. We have also included the physiotherapists in managing patients that would otherwise have had no follow up. Radial head fractures will be assessed by the TTAC physiotherapy to ensure that adequate range of motion is maintained. This would differ from previous well established VFC protocols *(17)* where those with radial head fractures are discharged from ED.

Twelve parents (40%) reported that they would have preferred to meet a doctor face-to-face as part of the assessment of their child's injury. This contrasts with parents reporting high levels of satisfaction with the information provided for them in ED, the availability of TTAC helpline, not requiring extra

childcare costs and most importantly being happy with the outcome of their child's injury. There was an increased number of parents in the buckle group (50% of all fractures) that would have preferred a face-to-face meeting. This may be explained using removeable splints rather than casting. The use of removal splints is a novel approach for fracture management and the ability of children to mobilise at such an early stage may worry some families. Further information needs to be shared with the public in relation to VFCs. The advantages of not queuing in a fracture clinic for long periods of time with an injury that can be adequately self-managed should not be underestimated.

Twenty-one parents (70%) advised that they would have had to organise childcare to mind other children if they had to attend TTAC. Twenty-six (87%) parents stated that they would need time from work to attend OPD. Provision of childcare is a considerable cost for families and there can also be considerable economic costs for staff and employers alike *(18)*. Most families in our review would have incurred considerable cost attending clinics with their children. Many parents state they would have needed to take extra time off work to attend. There is a clear cost-saving for families when managing paediatric fractures, such as buckle and clavicular fractures, in TTAC.

The telephone survey took place two years following injury. In one section of our review some parents reported being unable to remember whether they received information leaflets in ED. No other section in our review caused problems in terms of recall for parents. The high levels of satisfaction reported by telephone survey across all sections is reassuring despite the injuries occurring two years ago.

Due diligence took place when establishing the TTAC. No referrals are accepted from ED when patients are below the age of eighteen months. Eighteen months was adopted as a cut-off point due to risks of non-accidental injury (NAI) presenting with fractures below this age *(19,20)*. Buckle and clavicular fractures are not considered index fractures for NAI. No referrals are accepted to TTAC in children who present with two separate bone injuries from one traumatic episode.

No examination of medical and administration costs took place as part of this review. Cost savings have been well established for health services in relation to buckle fractures specifically and VFC in general *(5,21-23)*. Less patients for review in OPD allow for resources to be assigned elsewhere. TTAC focused on reviewing an increased number of elective patients in the time saved reviewing patients in fracture clinic

CONCLUSION

Discharge of patients by the TTAC using VFC protocols results in high levels of patient satisfaction. There are considerable benefits for parents including childcare costs savings, reduced loss of earnings and loss of leave entitlements. Parents report high levels of satisfaction with TTAC and they express high levels of satisfaction with how their children recovered from their injuries. A significant number of parents (40) expressed a preference for a face-to face consultation. TTAC should expand the service but should broaden the knowledge base of the principles of VFC within the hospital group. A public awareness campaign may also be of benefit for service users.

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