

EXPERT OPINION ON PUBLISHED ARTICLES

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What is the utility of a limb lengthening and reconstruction service in an academic department of orthopaedic surgery?

Rozbruch SR, Rozbruch ES, Zonshayn S, Borst EW, Fragomen AT
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Orthopaedic surgery has undergone a gradual evolution toward sub-specialisation over the last 30 years. The American Academy of Orthopaedic Surgeons currently recognises 22 orthopaedic speciality societies. One of the more recent subspecialties to emerge has been Limb Lengthening and Reconstruction Surgery. This area of orthopaedics is undergoing rapid growth across the world and South Africa is no exception, with increasing numbers of surgeons attracted to this field.

Despite increased awareness and practice of this subspecialty, early enthusiasm for this service has often been met with reluctance to establish dedicated limb reconstruction units in academic institutions. This has frequently resulted in complex reconstructions being undertaken by relatively inexperienced surgeons with suboptimal outcomes. This should motivate academic departments to establish dedicated units where cases can be concentrated and expertise developed.

In the current review, Rozbruch *et al.* shares their experience of developing such a dedicated Limb Lengthening and Complex Reconstruction Service (LLCRS) over a nine-year period at the Hospital for Special Surgery, Cornell University. The authors provide some background to their orthopaedic services and how the LLCRS is situated in their department. A review of their outpatient and surgical load showed a significant year-on-year increase in volume since the inception of the LLCRS in 2005. Noteworthy was the fact that 56% of patients in the unit were referred from orthopaedic surgeons, showing the need for such a highly specialised service that general orthopaedic surgeons can access when they are faced with complex cases that they themselves are either unwilling or unable to manage. A further 25% of cases tended to be self-referrals of patients following internet searches, indicating frustration with traditional orthopaedic service avenues that were unable to address their reconstructive needs.

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The authors further provide a breakdown of the types of cases their unit managed over a one year period, including foot and ankle, adult deformity, trauma reconstruction, arthroplasty, paediatric, limb salvage, tumour and upper extremity. The techniques that were used also varied considerably, including circular fixators, monolateral fixators, intramedullary nails, internal lengthening nails, plates and arthroplasty. This emphasises the in-depth knowledge of reconstructive techniques and recent advances in the field that reconstructive surgeons require.

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As an academic field, limb reconstruction is evolving rapidly, with more and more research emerging, and even journals dedicated to this field of orthopaedics appearing. With a dedicated service, this academic advance can be more focussed and productive. The LLCRS, during the period of review produced 49 peer-reviewed articles, 23 book chapters, review articles, and web based publications focused on limb deformity topics.

We have had a similar experience with developing the Tumour, Sepsis and Reconstruction Unit in Pietermaritzburg. Since the establishment of our unit in 2009, there has been an exponential year-on-year increase in referrals to our unit. The unit also had a significant contribution to the academic output of our department, with 30 research articles produced, nine masters degrees completed or underway and two doctoral degrees currently underway.

The research underlines the importance of a dedicated limb reconstruction service that general orthopaedic surgeons and patients can access when they are faced with complex cases requiring reconstruction. I concur with the findings of the authors and agree that the ideal setting for such a service to be the academic institutions in South Africa. The authors conclude by stating: 'With establishment of a dedicated service comes focus and resources that establish an environment for growth in volume, and purposeful research and education.'

Reviewer: Dr S Sombili

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SPECIALTY UPDATE: HIP

Management of the contralateral hip in patients with unilateral slipped upper femoral epiphysis To fix or not to fix – consequences of two strategies

G Hansson and J Narthorst-West

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Introduction

In this update, the authors state that whether or not the contralateral hip should undergo prophylactic fixation is still a matter of controversy. The aim of the paper was not to discuss whether or not prophylactic fixation of the contralateral hip should be performed routinely in all patients with unilateral slips at primary diagnosis, rather to discuss those important matters that need to be taken into account when deciding on how to manage the slipped upper femoral epiphysis (SUFE). The incidence of the subsequent slip of the contralateral side is reported to be up to 63% (Jerre *et al.*).

The risk of contralateral slip

Hagglund *et al.* found that in 260 patients with a unilateral SUFE the incidence of slipping of the contralateral side was 61%. Jerre *et al.* reviewed 61 patients with unilateral SUFE at primary diagnosis and found a 63% incidence of subsequent slipping of the contralateral side.

Patients at risk of contralateral slip

Risk factors have been used at the primary diagnosis of patients with unilateral slips in order to help identify those who will develop a contralateral slip to try and avoid unnecessary fixation of the contralateral hip. These risk factors include:

- a. Young age at primary diagnosis
- b. Skeletal maturity
- c. Female gender
- d. Endocrine disorders such as adiposogenital dystrophy
- e. The angle of the slip at primary diagnosis
- f. The slope of angle of the physis
- g. An open triradiate cartilage.

At present the authors would consider prophylactic fixation of the contralateral hip in children with adiposogenital dystrophy, nonspecific obesity, those cases in which there is a long delay between onset of symptoms of the slip at the initial consultation and children who are being treated with growth hormone. Finally in those cases where for social reasons or geographical reasons the patient cannot be expected to comply with a protocol of continued regular clinical and radiological observation.

Stabilisation or closure of the physis

The femoral neck grows at an estimated rate of 4 mm/year according to Menelaus. In patients where there is significant remaining femoral neck growth premature of closure of the physis will lead to a short femoral neck, producing a short lever arm for the abductors.

The fixation method should therefore stabilise the epiphysis and not fuse the physis when pinning the contralateral hip. Using smooth pins will avoid fusing the physis. Threaded pins should be avoided when fusing the contralateral hip.

Non-operative management

If this route is chosen, the authors recommend regular radiographs of the contralateral hip be obtained every 3 months until complete fusion of the physis has occurred. Billing and Severin believed that complete fusion of the triradiate cartilage ruled out subsequent slip of the femoral epiphysis.

For detection of the contralateral slip, lateral radiographs of the hip are the most commonly used methods. The method described by Billing in 1954 is the most accurate method of obtaining the lateral view of the hip. The hip is positioned in 25° of flexion and 90° external rotation using an external support device. A slipping angle is then measured which should be less than 7°, it indicates a definite slip if it is more than 13°.

Conclusion

In this update, it has been shown that pinning of the contralateral hip in SUFE is still controversial. Recommendations have therefore been suggested for pinning the contralateral hip and for observing it. The authors recommend that 3 monthly radiographs should be done if the contralateral hip is observed, a single lateral view as described by Billing should be done to avoid over-radiation exposure. They argued that modern radiological equipment has low radiation exposure. When the contralateral hip is pinned, a single smooth pin should be used to avoid closure of the capital femoral physis, multiple pins should be avoided.



Reviewer: Dr LC Marais

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Current concepts in the biopsy of musculoskeletal tumours

Traina F, Errani C, Toscano A, Pungetti C, Fabbri D, Mazzotti A, Donati D, Faldini C.
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Biopsy is a critical step in the diagnosis of bone and soft-tissue sarcomas. Current literature has not clarified the optimal biopsy technique of these tumours. While incisional biopsy (IB) is still considered the gold standard, recent literature suggests that fine needle aspiration (FNA) and core needle biopsy (CNB) may have a comparable diagnostic yield. In this current concepts review, from the AAOS exhibition selection, the authors from the Istituti Ortopedici Rizzoli explore the existing literature on the topic and propose guidelines for biopsy of bone and soft tissue tumours.

The potential advantages of percutaneous techniques noted in the article, include: decreased cost and theatre usage, low risk of adjacent tissue contamination and lower risk of complications due to its minimal invasive nature (0 to 10% compared to up to 16% for incisional biopsy). It is however agreed that incisional biopsy will not cause metastatic dissemination and that IB is still indicated when the diagnosis following a percutaneous biopsy is inconclusive or does not correspond to the clinical and radiographic findings.

The authors recommend ultrasound-guided CNB and CT-guided CNB as first line biopsy techniques in soft tissue and bone tumours, respectively. While these guidelines appear reasonable, the evidence for preference of one technique over another (in my opinion) remains weak. Of the 21 studies included in the review only one compared the diagnostic yield of incisional and percutaneous techniques on the same tumours, finding 100% accuracy for IB, 45% for CNB and 33% for FNA in terms of the specific histological diagnosis. In addition the authors state that many of studies reviewed excluded non-diagnostic samples, which falsely elevated the accuracy rate.

While we have increased the usage of CNB in our unit, IB is still preferred in many cases. Furthermore, the diagnostic accuracy of percutaneous techniques is a function of the expertise of histologists evaluating the case and we have found that as our unit's experience has grown the diagnostic yield has improved. It is essential, though, to emphasise that all the standard biopsy principles apply for percutaneous techniques. As stated by the authors the biopsy should be planned carefully on the basis of the location of the intended definitive surgery following MRI and should be performed by an experienced orthopaedic surgeon. A common error involves sampling of non-representative or necrotic areas.



If not done correctly a biopsy can complicate patient care and sometimes even eliminate certain treatment options. While the extraosseous extension of a malignant bone tumour is considered to be as representative of the tumour as the osseous component is, the shortest route to the lesion is not necessarily the optimal one. In addition the surgeon should not open any compartmental barrier, anatomic plane, joint space, or tissue area around a neurovascular bundle and should avoid creating a hematoma.

I consider this an excellent current concepts review on the topic. I have to agree with the authors' concluding sentiments: incisional biopsy appears to be the most accurate modality, the evidence is not strong enough to recommend one biopsy technique over another and that further research is required to determine the diagnostic accuracy of the various biopsy techniques.