

Case Report

Arthrodiastasis in the management of stiff hip

D. R. Ramprasath*, D. Kamaraj

Department of Orthopaedics, Institute of Orthopaedics and Traumatology, Coimbatore Medical College Hospital, Coimbatore, Tamil Nadu, India

Received: 30 August 2018

Revised: 03 January 2019

Accepted: 07 January 2019

***Correspondence:**

Dr. D. R. Ramprasath,

E-mail: dhurvasramprasath@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Arthrodiastasis (using external fixator and distraction) has been used for various pathologies including deformity correction/stiff hip/slipped capital femoral epiphysis. Historically this has been used for treatment of Perthes disease. The purpose of our study is to evaluate efficacy of arthrodiastasis in management of stiff hip. A 15 year old boy with stiff hip presented with complaints of pain in the left hip for past 6 months. Radiologically the left proximal femur was found to be deformed with metaphyseal widening, sclerosis and arthritic changes. Hip spanning external fixator using limb reconstruction system was done. Distraction was done at a rate of 1 mm/day. After 2 months, fixator was removed. Hip was mobilized under anaesthesia. Good range of all movements was achieved. Arthrodiastasis seems to be a good option in young adolescent in whom total hip replacement needs to be delayed as much as possible.

Keywords: Arthrodiastasis, Stiff hip, Adolescent, Joint distraction, Hip joint, Perthes disease

INTRODUCTION

Management of stiff hip is a challenging problem. Even though option like hip replacement surgery is available in adults, option in paediatric and adolescent age group is limited. The goal of treatment in patients with stiff hip in adolescent age is to achieve early range of motion and postponement of hip replacement until adulthood is reached. The distraction of joints including hip, knee, ankle and elbow has been described for various orthopaedic conditions such as trauma and sequelae, septic arthritis, tuberculosis, epiphysiolysis, chondrolysis, and Perthe's disease.¹⁻⁶ This can be in the form of skeletal traction or joint spanning external fixator application (arthrodiastasis). We have performed arthrodiastasis using hip spanning external fixator (limb reconstruction system) in an adolescent boy with stiff hip and evaluated the results.

CASE REPORT

A 15 year old boy with previous history suggestive of sub-acute osteomyelitis left proximal femur 5 years back presented with complaints of chronic persistent pain and limitation of movements in the left hip for past 6 months. On examination, hip was fixed in 10 degree of fixed flexion deformity, 10 degree abduction, 45 degree external rotation and further flexion of hip was possible up to 70 degree; stiff hip gait; 2 cm limb length shortening (Figure 1).

X-ray showed widening and sclerosis of the metaphysis and deformed femoral head. MRI revealed irregularity in articular cartilage (Figure 2).

Range of movement was rechecked under spinal anesthesia and was found to be the same as mentioned above. Hip spanning external fixator using limb reconstruction system with 3 schanz pins in pelvis, 2

schanz pins in proximal femur and 2 schanz pins in femoral shaft was applied (Figure 3).



Figure 1: Clinical picture showing flexion and external rotation deformity.

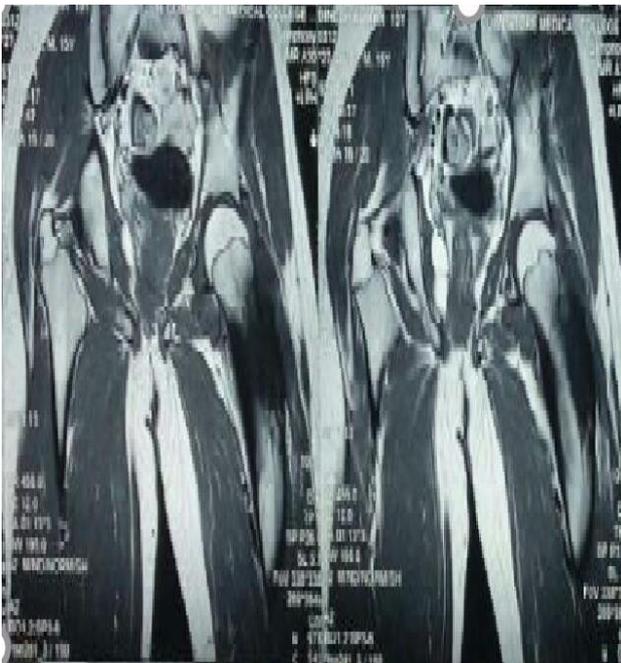


Figure 2: MRI showing signal changes in metaphysis of left femur with irregular articular surface.



Figure 3: Clinical and radiographic appearance of the construct.



Figure 4: X-ray showing adequate distraction with subluxation of hip joint at the end of second month.

Distraction was started at the rate of 0.5 mm twice a day. Serial radiographs were taken at 2 weeks, 4 weeks and 6 weeks. Distraction was temporarily deferred for few days for pain relief. X-ray taken at 2 months from the date of fixator application demonstrated 2.5 cm distraction of the hip joint along with inferior subluxation of femoral head. There was no evidence of pin loosening (Figure 4).

Fixator was removed at the end of 2 months. Patient underwent a regime of hip mobilization by physiotherapist for a period of 1 week. Since the patient was not co-operative and did not move his left hip, we performed mobilization under spinal anaesthesia.

RESULTS

A good range of flexion (0-120 degree), internal rotation (0-30 degree), external rotation (0-45 degree), adduction (0-30 degree) and abduction (0-30 degree) was achieved (Figure 5, 6, 7).



Figure 5: Range of movements under anaesthesia-hip flexion.



Figure 6: Range of movements under anaesthesia-external and internal rotation.



Figure 7: Range of movements under anaesthesia-adduction and abduction.

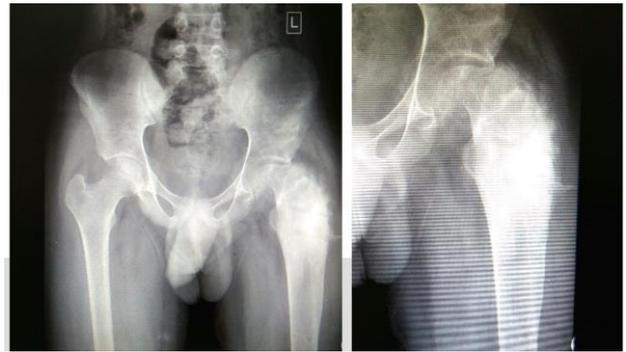


Figure 8: X-ray after two weeks of fixator removal shows adequate joint space and well reduced hip joint.

Mobilization exercise was carried out after mobilization under anaesthesia by our physiotherapist. X-ray taken two weeks after mobilization (Figure 8) showed adequate joint space with well reduced hip joint.

Patient was discharged and advised regular mobilization exercise. Unfortunately we lost the patient to follow up for a period of 4 months. In the subsequent follow up, we found that stiffness in the hip was relapsed.

DISCUSSION

Even though various options are available for treatment of stiff hip like mobilization under anaesthesia, arthrodiastasis, arthrolysis (arthroscopic/open surgical), arthroplasty (excision / hemiarthroplasty / total hip replacement), arthrodesis-treatment option in adolescent is very limited. Since total hip replacement, arthrodesis is not advised for adolescent, arthrolysis and arthrodiastasis prove to be main options in this age group.

Historically arthrodiastasis was first reported in Verona 1979 for treatment of Perthes disease.^{7,8}

Arthrodiastasis is hypothesized to create negative pressure on femoral head and preserve joint space, in an attempt to decrease the harmful effects of subchondral fractures.¹ Moreover, according to Singh et al, hip distraction in Perthes disease unloads the joint, promotes sound healing of area of necrosis.⁹ Arthrodiastasis done as first stage dramatically reduced pain and Trendelenberg limp leading to substantial improvement in range of motion and hinged abduction in Perthes disease, which allowed to proceed with surgical containment later on.^{10,11}

Complications of arthrodiastasis include pin tract infections, pin loosening and pin breakage.¹⁰ In our study we encountered severe pain in our patient probably due to stretching of the stiff capsule and other soft tissues. This prompted us to stop distraction for a few days. Co-operation for physiotherapy may be a problem after removal of fixator. This may lead to failure of the procedure (as in our case).

CONCLUSION

Although arthrodiastasis has been used mostly for patients above 6 years with Perthes disease, the indication can be extended to various pathologies causing stiff hip particularly in children and adolescent age groups, where replacement arthroplasty is not advised. Moreover good results can be expected in children and adolescent, because of biological plasticity of femoral head and potential to revascularize and remodel in patients with deformed femoral head. Patient's co-operation is the key for good functional outcome.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

REFERENCES

1. Luzo CAM, Guarniero R, Montenegro NB, de-Godoy RM Jr. Initial experience of use of an articulated external fixator in treating Legg-Calve-Perthes disease by means of arthrodiastasis during the active phase of the disease. Rev Bras Ortop. 2016;51(3):330-45.
2. Volkov MV, Oganessian OV. Restoration of function in the knee and elbow with a hinge-distractor apparatus. J Bone Joint Surg Am. 1975;57(5):591-600.
3. Krumins M, Kalnis J, Lacis G. Reconstruction of the proximal end of the femur after hematogenous osteomyelitis. Pediatr Orthop. 1993;13(1):63-7.
4. Canadell J, Gonzales F, Barrios RH, Camillo S. Arthrodiastasis for stiff hips in young patients. Int Orthop. 1993;17(4):254-8.
5. Judet R, Judet T. Arthrolyse et arthroplastie sous distracteur articulaire. Rev Chir Orthop Reparatrice Appar Mot. 1978;64(5):353-65.
6. Cobb TK, Morrey BF. Use of distraction arthroplasty in unstable fracture dislocation of the elbow. Clin Orthop Relat Res. 1995;(312):201-10.
7. Kim SS, Lee CW, Kim HJ, Kim HH, Wang L. Treatment of Late-Onset Legg-Calve-Perthes Disease by Arthrodiastasis. Clin Orthop Surg. 2016;8(4):452-7.
8. Aldegheri R, Trivella G, Saleh M. Articulated distraction of the hip. In: De Bastani G, Apley AG, Goldberg A, eds. Orthofix external fixation in trauma and orthopaedics. London:Springer Verlag. 2000; 605-12.
9. Singh A, Srivastava RN, Shukla P, Pushkar A, Ali S. Management of Late Onset Perthes: Evaluation of Distraction by External Fixator-5-Year Follow-Up. Hindawi Publishing Corporation. 2014;1-6.
10. Sudesh P, Bali K, Mootha AK, Dhillon MS, Saini R. Arthrodiastasis and surgical containment in severe late-onset Perthes disease: An analysis of 14 patients. Acta Orthopaedica Belgica. 2010;76(3).
11. Weinstein SL. Long-term follow-up of pediatric orthopaedic conditions. Bone Joint Surg. 2000;82(A):980-90.

Cite this article as: Ramprasath DR, Kamaraj D. Arthrodiastasis in the management of stiff hip. Int J Res Orthop 2019;5:352-5.