大臼杯全髋关节置换术治疗 Crowe Ⅱ ~ Ⅲ型成人髋关节发育不良疗效观察

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摘要:目的 总结大型臼杯生物型人工全髋关节置换术治疗 Crowe Ⅱ ~ Ⅲ型成人髋关节发育的早期疗效。**方法** 12 例 12 髋,Crowe Ⅱ 型为 7 例,Crowe Ⅲ 型为 5 例,全髋关节置换术臼杯外径 58 ~ 64 mm,假体选用国产爱康宜诚公司生产的假体。**结果** 随访 2 ~ 3 年。髋关节功能 Harris 标准评分平均 92 分,其中功能优 9 例,良 3 例,目前尚无 1 例需行翻修。**结论** 对部分 Crowe Ⅱ、Ⅲ型成人髋关节发育不良,采用大型臼杯全髋关节置换术治疗早期能够获得满意的临床疗效。

关键词: 大臼杯; 关节置换; 髋关节; 发育不良
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Efficacy observation of acetabular cups of hip replacement surgery on adult hip crowe II and III dysplasia

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Abstract: Objective To summize the early efficacy of large-scare acetabular cups of hip replacement surgery on adult hip Crowe II and III dysplasia. **Methods** There were 12 patients in which 7 cases were Crowe II and 5 cases were Crowe III. The outside diameter of acetabular cup for total hip replacement surgery was 58 ~ 64 mm. Ai-Kang prostheses which were made in China were used. **Results** The patients were followed up for 2 to 3 years. The average Harris hip standard score was 92. The hip functions of 9 cases were excellent and those of 3 cases were good. No case needed to restore. **Conclusions** For some cases of adult hip Crowe II and III dysplasia, early hip replacement surgery with large-scare acetabular cups can obtain satisfactory clinical effect.

Key words: large-scare acetabular cup; joint replacement; hip joint; dysplasia

自 20 世纪 60 年代第一例人工全髋关节置换手术(THR)成功开展以来,全髋关节置换术目前已经得到广泛开展,并且越来越成熟,越来越微创化,但是针对某些复杂病例的全髋关节置换,仍有许多棘手的问题亟待我们去解决,其中成人发育性髋关节发育不良(development displasia of the hip,DDH)的全髋关节置换目前已经成为当前手术的热点及难点问题,本文主要针对 Crowe Ⅱ、Ⅲ型成人髋关节发育不良应用大臼杯全髋关节置换病例的进行早期疗效分

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析，结果提示疗效较为满意，报道如下。

1 资料与方法

1.1 一般资料 本组病例共 12 例 12 髋，均为单侧病变；男 3 例，女 9 例，年龄 46 ~ 58 岁，平均 54 岁；左髋 2 例，右髋 10 例；Crowe Ⅱ型为 7 例，Crowe Ⅲ型为 5 例；术前肢体短缩 2 ~ 4 cm，平均 2.8 cm，术前髋关节功能 Harris 标准评分[1] 平均 52 分；全髋关节置换术臼杯外径 58 ~ 64 mm，全部使用国产爱康宜诚公司生产的假体。

1.2 治疗方法 术前认真体检，了解患肢短缩程度及患髋各个方向活动受限程度并测量，完善双髋正位片及患髋正侧位片检查并认真做好 X 线测量，完善双髋的 CT 扫描和三维重建，明确真臼位置、大小、前倾角、真臼环骨质厚薄以指导手术操作及假体的选择。手术操作：麻醉显效后，患者取健侧卧位，患侧在上，注意侧卧时躯干和骨盆要位于一个垂直平面上，避免在髋臼窝的磨锉上导致假体安放角度不必要的误差。手术野常规消毒铺单，贴无菌贴膜，作后外侧切口，切开皮肤、皮下组织，阔筋膜张肌，顺臀大肌纤维方向钝性分离臀大肌，屈曲、内收、内旋患髋，显露、切断外旋肌止点。若内收肌过紧，可在外旋位切断内收肌，在屈髋、内收、外旋下，脱出股骨头，按术前制定的截骨线在小转子上的股骨颈处截骨，取出股骨头，彻底切除增厚挛缩的关节囊、纤维瘢痕组织及假臼周围骨赘等，顺着关节囊并通过横韧带找到真髋臼，切除挛缩关节囊、纤维组织及髋臼内的瘢痕、脂肪组织，用从小到大的髋臼锉处理髋臼，以下方横韧带为下缘，向内下方加深髋臼，按照前倾 15°、外展 45°扩大，重建髋臼，安放非骨水泥型臼假体。本组病例患者平均年龄为 54 岁，影像学检查提示骨质疏松不明显，真臼环骨质有足够厚度，为获得较大的假体接触面积，本组病例均选择了臼杯外径大于 58 mm 的髋臼假体，其中最大的臼杯外径为 64 mm，均获得较好的压配及较大的接触面积，无一例因髋臼骨缺损需要行结构性植骨。股骨侧：保持 15°前倾角，用髓腔锉扩大股骨近端髓腔，一般股骨颈截骨线应紧贴小转子上缘，以便让假体柄尽可能下沉，避免下肢延长过多，依次缝合外旋肌群，阔筋膜张肌，阔筋膜皮下组织，皮肤，常规切口负压引流管引流。

1.3 术后处理 术后预防性使用抗生素 24 ~ 48 h，24 h 后常规应用抗凝药物[2]。避免关节内收内旋，保持外展 20° ~ 30°，24 ~ 48 h 内视情况予以拔除切口引流管。拔管前床上肌肉舒缩短缩，关节屈伸锻炼，拔管后鼓励患者助行器保护下部分负重行走，3 个月后完全负重。

2 结果

术后对 12 例（12 髋）进行 2 年 1 个月 ~ 3 年 4 个月的随访，按 Harris 评分系统评价患者髋关节功能，其中 8 髋 > 90 分，4 髋 80 ~ 89 分，优良率达 100%，本组患者均为单侧患病，术前均有明显肢体短缩，术后肢体短缩得到满意纠正，基本达到肢体等长，效果理想。见图 1 ~ 4。

图 1 术前右髋关节正位片

图 2 术前右髋关节侧位片

图 3 术后正位片，髋臼杯外径大小为 60 mm

图 4 术后正侧位片，髋臼杯外径大小为 60 mm

3 讨论

髋关节发育不良主要表现为：真臼上缘骨缺损伴有骨质硬化，髋臼前壁薄而后壁相对较厚；股骨头变形，伴有不同程度的前倾，股骨髓腔狭窄，可能存在股骨近 1/3 的向前弯曲，髋关节周围肌肉韧带挛缩，患肢短缩，关节囊随脱位被拉长并局部形成粘连。髋关节软骨面出现不同程度的硬化、囊性变、软骨面剥脱，骨质外露。骨质磨擦导致股骨头坏死、塌陷、变形。周围骨赘形成，导致股骨头变大、变扁，部分患者可有骨盆倾斜和脊柱畸形。髋关节正常的解剖结构改变后，正常的生物力学亦遭到破坏，继发髋关节功能障碍及疼痛的发生[3]。全髋关节置换术是目前公认的治疗髋关节发育不良重要手术方式之一[4]。但需要明确的一点是：对于只有跛行、步态不佳、肢体短缩等症状的患者，决非全髋关节置换的适应症，只有当患者出现疼痛且有明显的功能阻碍，并且 X 线片显示髋关节有明显的退行性改变时，才可考虑实施全髋关节置换术。研究表明，生物型髋关节假体治疗髋关节发育不良取得了满意的疗效。但是髋关节发育不良患者髋关节失去正常的解剖关系，因此手术难度较大，术前准备需充分：仔细查体，每个病例均摄双髋正位片及患髋正侧位片、双髋关节三维 CT。本组病例均选择大臼杯髋臼假体而无一例通过结构性植骨获得了良好的覆盖，术前 CT 对真臼环骨质厚薄的评估十分关键。若术中盲目选择大臼杯髋臼假体特别是针对 Crowe Ⅲ髋关节发育不良的病例将导致臼底磨穿的风险。基于对 12 例患者 CT 的评估，年龄因素与髋臼真臼环骨质厚度呈正相关，这也是我们选择大臼杯髋臼假体的主要依据。

完成了术前评估，术中的操作更为重要。髋臼侧的重建、充分的软组织松解、及股骨近端的处理是手术成功的关键[5]。

在行髋关节显露、股骨颈截骨后，首先要寻找真臼，显露髋臼时若真臼未能显露出来，可利用分隔真假臼的骨脊作

为解剖标志，并由此向下分离，找到髋臼横韧带，张福江等[6]认为髋臼横韧带是髋臼缘的部分结构，位置明显、恒定，不受骨盆体位变化或髋臼发育不良等因素影响，是一种可靠的参考标志，先打磨，找到卵圆窝，以此定位髋臼窝，分离牵开周围软组织，充分显露真臼。寻找到真臼后，清理真臼内软组织及周围骨赘，完全显露真臼，髋臼锉从小到大逐一保持前倾15°，外展45°磨锉髋臼，满意的髋臼覆盖是关键[7]，磨锉髋臼时，应指向后方以避免破坏前壁。一般情况下，应尽量将髋臼假体置于真臼处[8]，原因是髂骨在髋臼水平较厚，越往上骨质越薄，若在真臼上方重建髋臼，易出现骨质覆盖不足，另外，对于DDH患者，假体置于真臼位置可以保持骨盆和股骨肌肉群的平衡及合适的关节面压力负荷分布。若假体置于假臼处，股骨头旋转中心向上侧、外侧移位，压力主要集中于髋臼后上缘，会增加术后假体的磨损。据Linde与Jensen对129例DDH行全髋关节置换病例15年随访结果，髋臼置于真臼或临近真臼的假体松动率为13%，而在真臼顶部以上位置置入的假体松动率为42%；Heisel等[9]在采用全髋关节置换术治疗髋关节发育不良患者中，均在真臼内放置假体重建髋关节旋转中心，随访7年疗效满意。对于大多数患者，在真臼处需要进行髋臼加深和使用小直径髋臼假体。但是本组病例中由于患者的平均年龄较为年轻(54岁)，术前CT评估真臼环骨质有足够厚度，骨量充足，本组12例患者均选择大直径髋臼杯假体，臼杯的骨性包容均达70%以上，无需结构性植骨。大型臼杯重建髋臼骨缺损[10]，因具有能增加臼杯与髋臼骨的接触界面，有利于初次固定；能借助臼杯的自身充填，显著减少植骨量；能借助髋臼锉将某些骨缺损磨锉为半球状，有利于臼杯的压配合；髋关节的旋转中心可被移向更为合理的外下方，符合髋关节的生物力学要求等特点，Sutherland[11]证实此法疗效较为满意。

髋关节发育不良的患者脱位越重，髋周软组织形态改变越严重。因此髋关节发育不良的患者往往需要行软组织松解，Yang等[12]认为有效的松解不仅可使术中复位顺利，克服肢体短缩，还能实现髋关节旋转中心化，最大限度地恢复关节功能。对紧张的阔筋膜张肌、挛缩的臀中肌、内收肌、紧张的髂腰肌、挛缩股直肌以及纤维瘢痕化的关节囊都可进行适当的松解，纠正髋关节屈曲挛缩畸形。一般情况下，首先咬骨钳咬除髋臼周围大量的骨赘、松解或切除关节囊、纤维挛缩带，然后松解上述肌肉组织。髋关节屈曲畸形者，可松解前关节囊、髂腰肌等前方软组织，而对外展受限者可切断内收肌加以松解。软组织松解需适度，否则可引起髋关节过于松弛等并发症，对髋关节的稳定性将产生影响。

在股骨侧的处理上，术前因根据X线片了解股骨髓腔类型，准备相应的股骨侧假体，对髓腔细小者，应使用小号假体。在股骨髓腔成形时避免前倾角过大，若过大，则可导致髋关节前脱位并影响髋关节外旋功能。同时在扩大髓腔过程中要防止股骨劈裂和穿出。还有一点需要指出的是，当髋臼假体置于真臼的位置时，股骨侧假体的复位相对困难，且下肢可能延长较多，一般下肢延长不应超过4 cm，Uskova等[13]认为，如下肢延长大于4 cm容易产生股神经牵张性麻痹。此时除完全切除关节囊、彻底松解松解周围软组织、使用短颈股骨假体外，可能需要行转子下截骨、股骨短缩，本组病例DDH为CroweⅡ、Ⅲ型，下肢短缩均不超过4 cm，无1例行截骨治疗，单纯行软组织松解即可达满意效果。

髋关节发育不良手术的关键在髋臼侧处理上，本组病例在大臼杯全髋关节置换术治疗CroweⅡ～Ⅲ型成人髋关节发育不良取得了满意的疗效，但由于髋臼骨缺损的表现十分复杂，以及大型臼杯置换术本身尚存在以下缺点：过度的磨锉髋臼导致髋臼骨量进一步散失，影响了臼杯的稳定性，以及髋臼底部磨穿，导致假体中心性脱位，髋臼骨量丢失导致二次翻修困难等，因此行大臼杯全髋关节置换需要把握好适应证。以及亟待后期大样本统计研究及长期随访。

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Efficacy observation of large-diameteracetabular cups in total hip replacement for the treatment of Crowe type II and III developmental dysplasia of the hips in adults

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Abstract:
Objective: To summarize the early efficacy of large-diameter acetabular cups in cementless total hip replacement for the treatment of Crowe type II and III developmental dysplasia of the hips in adults. **Methods:**A total of 12 patients (20 hips) were enrolled, in which 7 patientspresented with Crowe II and 5 with Crowe III. The external diameters of acetabular cups for total hip replacementranged from 58 to 64 mm. Prostheses produced by the domestic company AK were used. **Results:** The patients were followed up for 2 to 3 years. The average Harris hip standard score was 92. The hip functions of 9 patients were excellent and those of 3 were good, andno patients neededrevision. **Conclusions:** For some adult patients with Crowe II and III developmental dysplasia of the hips, the employment of large-diameter acetabular cups in total hip replacement can yield satisfactory clinical efficacy in the early stage.
Key words:large-diameter acetabularcup;replacement; hip joint; dysplasia
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Since the successful performance of artificial total hip replacement (THR) on the first patient in the 1960s, THRhas been widely conducted to date, and is becoming increasingly mature and minimally invasive.However, there are still many difficult problems to be solvedfor total hip replacement in some complex cases.Among these, total hip replacement for development displasia of the hips(DDH) has represented a hotspot and a difficult problem in the current surgical operations.In this paper,the early efficacy of large-diameter acetabular cups in total hip replacement for the treatment of Crowe type II and type III developmental dysplasia of the hip in adults was analyzed, with the results suggesting thatthe efficacy was satisfactory. It is reported below.

1. Data and methods

1.1 General data

A total of 12 patients(12 hips) with unilateral lesions were enrolled in this group, including 3 males and 9 females aged 46 to 58 years, with the mean age at 54 years.Two patientspresented withlesions in the left hips and the other 10 in the right hips.Sevenpatientsmanifested Crowe II and 5 Crowe III.Preoperatively, they had an limb shortening of 2 to 4 cm, with an average of 2.8 cm, and their Harris hip functionstandard score[1] averaged 52 points.The external diameter of acetabular cups in total hip replacement was 58 to 64 mm, and all the prostheses produced by the domestic company AKEC were used.

1.2 Treatment methods

Careful preoperative examinations were performed to determine the extent of shortening of the affected limbs and the extent of limited mobility of affected hips in all directions, and measurement was conducted.Anteroposterior radiography of both hips and andthe anteroposterior and lateral radiography of affected hips were improved, and the X-ray measurement was performed carefully. CT scanning and three-dimensional reconstruction of both hips were improved to determine the position, size and theanteversion angle of the real acetabulum and the bone thickness of the real acetabular ring, so as to guide surgical

procedures and the selection of prostheses. Surgical procedures: Afteranesthesia took effect, patients lied on the healthy side, with the affected side upward.Attention should be paid to ensure thatthe torso and the pelvis were located on a vertical plane when patients lied, avoid unnecessary errors in the placement angleof the prosthesis caused bythe reaming of the acetabular fossa. Routine disinfection and drapingof the surgical field and sticking of sterile films were performed.A posterolateral incision was made. The skin, subcutaneous tissues and tensor fasciae latae were cut open to bluntly dissect the gluteus maximus along the muscular fibers of the gluteus maximus.Flexion, adduction and internal rotation of the affected hip were performedto expose and severthe external musclerotation points.If the adductor muscle is too tight, it could be severed at the external rotatory position.Under flexion, adduction and external rotation, the femoral head was prolapsed, and osteotomy was performed at the femoral neck on the lesser trochanter according to the preoperativelyderermined osteotomy line toharvest the femoral head and completely resectthe thickened and contracturedjoint capsule, fibrous scar tissuesand osteophytes around the artificial acetabulum, etc. The real acetabulum was found along the joint capsule and through the transverse ligament, and the contracturedjoint capsule, fibrous tissues, and scars and adipose tissues within the hip acetabulum were resected.Acetabular reamers, from small to large,were used to treat the acetabulum, with thetransverse ligament at thelower side as the lower rim.The acetabulum was deepened inward and downward, and expanded at an anteversion of 15 ° and abduction of 45°.The acetabulum was reconstructed, and the cementlessacetabular prosthesis was placed.The mean age of patients in this group was 54 years, and the imaging examinations indicated that osteoporosis was not significant and that the realacetabular bone ring had a sufficient thickness.In order to obtain a reativelylarge contact area of the prosthesis, acetabular prostheses with the external diameter of acetabular cups greater than 58 mm were used in patients in this group, with the largest external diameter at 64 mm.Good press-fit and large contact areas were achieved in all patients, and nopatients needed structural bone graft due to acetabularbone defects. Femoral side: The anteversion angle was kept at 15 °, and an intramedullary reamer was used to expand the proximal femoral medullary cavity.Usually, the osteotomy line of the femoral neck should be close to the upper rim of the lesser trochanter, so that the prosthetic stem could sink as much as possible, avoiding the excessive extension of the lower limbs.The external rotator muscles of the hip, the tensor fascia lata, the subcutaneous tissues of the fascia lata and the skin were sutured successively,and a negative pressure drainage tube was inserted routinely at the incision for drainage.

1.3 Postoperative treatment

Prophylactic use of antibiotics for 24 to 48h after the surgery was adopted, and 24h later, the routine use of anticoagulant agents was conducted[2]. Adduction and internal rotation of joints were avoided, and they were kept in abduction at 20 ° to 30 °.The drainage tube at the incision was removed within 24 to 48h depending on the circumstances. Prior to tube removal, muscle contraction and shortening, flexion and extension exercises should be performed in bed.After the tube was removed, patients were encouraged topartially take weight-bearing walks under the protection of walking aids, and to walk freely with weight after 3 months.

2. Results

After the surgery, the 12 patients (12 hips) were followed up for 2 years and 1 month to 3 years and 4 months.The hip functionsof patients were evaluated according to the Harris hip score system, and specifically, the scores for eight hips were over 90points and the scores for the other 4 hips were 80 to 89 points, with the excellent and good rate as high as 100%.All patients in this grouppresented with unilateral lesions and significant limb shortening preoperatively.And postoperatively, their limb shortening was satisfactorily corrected, basically achieving equal length of all limbs.The results were satisfactory. See Figures 1 to 4.

3. Discussion

Developmentaldisplasia of the hips is mainly manifested as bone defects at the upper rim of the real acetabulum with sclerosis, thin acetabular anterior wall while relatively thick acetabular posterior wall, femoral head deformation combined with anteversion of varying degrees, femoral medullary stenosis, possible forward bending of the femur by nearly 1/3, contractures of muscles and ligaments around the hip joints, shortening of affected limbs, stretching ofthe joint capsules with the dislocation and the local formation of adhesions. Surfaces of the hip cartilages present with sclerosis of varying degrees, cystic changes, stripping of cartilage surfaces and bone exposure. Bone friction causes necrosis of the femoral head, collapse and deformation. Osteophyte formation leads to larger and flatter femoral heads, and some patients may present with tilted pelvis and spinal deformity. After the normal anatomic structure of the hip was changed, the normal biomechanics was also destroyed, secondary to which were hip dysfunction and pains[3]. Total hip replacement is widely recognized as an important surgical method for the treatment of developmental dysplasia of the hips[4]. But one thing needs to be made clear: patients with with limp, poor gait and limb shortening, etc.are by no means the indications of total hip replacement, and the implementation of total hip replacement is considered only when patients have pains andsignificant dysfunctions, and significant degenerative changes are found by X-ray. Studies have shown that biological hip prosthesesfor the treatment ofdevelopmental dysplasia of the hips achieve satisfactory therapeutic efficacy. However,the hip joints of patients with developmental dysplasia of the hips losethe normal anatomical relationship, and therefore,the difficultiesin surgical operations are relatively huge and the preoperative preparations should be adequate: careful physical examinations, during which each patient underwentanteroposteriorradiography of both hips, the anteroposterior and lateral radiography of the affected hip,and three-dimensional CTs of both hip joints. Acetabular prostheses with large-diameteracetabular cups were used in all patients in this group,and no patients achieveda good coverage through structural bone graft.The preoperative CT was critical to the evaluation of thethickness of the real acetabular bone ring. Indiscriminate use of acetabular prostheses with large-diameteracetabular cups in surgeries, especially for patients with Crowe III developmental dysplasia of the hips, will result in the risk of wearing out of the acetabular bottom. Based on the evaluation of CTs on 12 patients, age and the thickness of the real acetabular bone ring were positively correlated, whichwas also the main basis for usingacetabular prostheses with large-diameteracetabular cups.

After the preoperative evaluation was completed, the intraoperative operation was more important. Acetabular reconstruction, adequate soft tissue release and the treatment of the proximal femur were key to successful surgeries[5].

After the exposure of the hip joint andosteotomy of the femoral head, the real acetabulum should be found first.If the real acetabulum fails to expose when exposing the acetabulum, the bone ridgeseparating the real and the artificial acetabula can be taken advantage of as an anatomical marker, and separation downward from it is performed to find the transverse acetabular ligament. Zhang Fujiang[6] believed thatthe transverse acetabular ligament was a partial structure of the acetabular rim, and that its position was clear and constant, unaffected by such factors as the changes in the position of the pelvic or acetabular dysplasia.And therefore, it was a reliable reference marker.Grinding was conducted first to find the oval fossa, whereby the acetabular fossa was positioned.Then the surrounding soft tissues were separated and retracted to fully expose the real acetabulum. After the real acetabulum was found, soft tissues and surrounding osteophytes within the real acetabulum were cleaned up to fully expose the real acetabulum.Acetabularreamers, from small to large, werekept in anteversion of 15 ° and abduction of 45 ° to ream the acetabulum, and satisfactoryacetabular coverage was thekey[7].When the acetabulum was reamed, the reamers should point backwardsso as to avoid damages to the anterior wall.Under normal circumstances, the acetabular prosthesisshould be placed in the realacetabulum[8] because the iliac bones are relatively thick at theacetabular level, and the higher the level is, the

thinner the bones will be.If the acetabulum is reconstructed above the real acetabulum, a lack of bone coverage may occur easily.In addition, for DDH patients, the prosthesis placed in the real acetabulum can maintain the balance between the pelvis and femur muscle groups and the proper distribution of articular surface pressure loads. If the prosthesis is placed in the artificial acetabulum, the center of rotation of the femoral head moves upward and outward. In this case, the pressure focuses on the upper rim of the acetabulum, which will increase the wear of the prosthesis after the surgery. According to the results of a 15-year follow-upon 129 DDH patientsundergoing total hip replacementby Linde and Jensen, the rate of prosthetic loosening was 13% when the acetabulum was placed in or close to the real acetabulum, whereas the rate of prosthetic loosening was42% when the acetabulum was placed above the top of the real acetabulum.In DDH patients undergoing total hip replacement by Heisel et al.[9], prostheses were placed in the real acetabula to reconstructthe hip rotation center, with satisfactory therapeutic efficacy achieved in the 7-year follow-up. For mostpatients, acetabular deepening at the real acetabulum and use of small-diameter acetabular prostheses are needed. However, the mean age of patients in this group was relatively young (54 years), and the preoperative CT evaluation indicated that the realacetabular bone ring had a sufficient thickness and the amount of bone was plenty.For the 12 patients in this group, prostheses with large-diameter acetabular cupswere used, with the bony inclusion of the acetabular cups reaching more than 70% and no structural bone grafts. Large-diameter acetabular cups for the reconstruction of acetabular defects of the hip[10]is conducive to the initial fixation due to their abilities to increase thecontact interface between the cups and acetabular bones,and can significantly reduce bone grafts by means of the self-filling of the acetabular cups. Besides, they can facilitate the press-fit of the acetabular cups by reaming some bone defects into hemispheres with the aid ofacetabular reamers.The rotation center of the hip joint can be moved to more reasonable outward and downward area, which is in line with such characteristics as the biomechanical requirements of the hip.Sutherland[11] confirmed thatthe efficacy of this method was relatively satisfactory.

The severer the dislocation in patients with developmental dysplasia of the hips is, the severerthe morphological changes of soft tissues around the hipare. Therefore, patients with developmental dysplasia of the hips often need to undergo soft tissue release. Yang et al.[12]thought thateffective release could not only lead to successful intraoperative reduction and overcome limb shortening, but also achieve the centeralization of rotation of the hip, restoring the joint function to the largest extent. An appropriate release can be performed on the tight tensor fascia lata, contracturedgluteal muscles, adductor muscles, tight iliopsoas, contracturedrectus femoris scar and joint capsules with fibrous scars to correct hip flexion, contracture and deformity. Under normal circumstances, arongeuris used to remove the large amounts of osteophytes around the acetabulum, andthe joint capsule and fibrous contracture are released or removed.Then the above-described muscle tissues are released. In patients with hip flexion and deformity, the anterior soft tissues like the anterior joint capsule and iliopsoas can be released. While in patients with abduction restriction, release can be performed by cutting off the adductor muscle. Soft tissue release should be conducted moderately, or it can cause such complications as excessive loosening of the hip joint, thus affecting its stability.

As to the treatment of the femoral side, the type of the femoral medullary cavity should be determined according to the X-ray films before the surgery so as to prepare the corresponding femoral prosthesis, and for patientswith thin and small medullary cavities, smaller prostheses should be used. When the femoral medullary cavity takes shape,a too largeanteversion angle should be avoided, or itcan lead to the anterior dislocation of the hip joint and affect the external rotation function of the hip joint. At the same time, splittingand piercing of the femur should be avoided during the process of expanding the medullary cavity. Another point that needs to be noted is that, when the acetabular prosthesis is placed in the position of the real acetabulum, the reduction of the femoral prosthesis becomes relatively difficult, and the lower limbs may be extended exceedingly, with the normal

extension of the lower limbs not more than 4 cm. Us-kova et al.[13]believed that the extension of the lower limbs by more than 4cm gives rise tostretch paralysis of femoral nerves easily, at which time subtrochantericosteotomy and femoral shortening may be needed in addition to a total resection of the joint capsule, a complete release of soft tissue and use of short-neck femoral prostheses. DDHs of patients in this group were Crowe II and III, and the shortening of the lower limbsdid not exceed 4 cm.Besides, no patients underwent osteotomy, and satisfactory results were achieved through soft tissue release alone.

The key to surgeries for developmental dysplasia of hipis the treatment of the acetabular side, and for patients in this group,satisfactory therapeutic efficacy was achievedusing large-diameter acetabular cups in total hip replacement for the treatment of Crowe type II and type III developmental dysplasia of the hip in adults.However,the manifestations of acetabular bone defectsare very complex and total hip replacement using large-diameter acetabular cups has the following drawbacks: excessive reaming ofthe acetabulum causes further loss of bone mass, affecting the stability of acetabular cups.In addition,wearing out of the bottom of the acetabulum results in central dislocation of the prosthesis, and acetabular bone loss leads to difficulties in secondary revisions. Therefore,when total hip replacement using large-diameter acetabular cups is performed, a good grasp of indications is needed. Besides, a large sample-based statistical study in the later stage and a long-term follow-up are urgently needed.

Figure 1Anteroposterior radiograph of the right hip joint before the surgery

Figure 2 Lateral radiograph of the right hip joint before the surgery

Figure 3Anteroposterior radiograph after the surgery, with the external diameter of the acetabular cup at 60 mm

Figure 4Anteroposterior and lateral radiographs after the surgery, with the external diameter of the acetabular cup at 60 mm

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