

## RESULT OF BILATERAL TOTAL HIP REPLACEMENT IN THE TREATMENT OF A CHILD WITH CEREBRAL PALSY

*Baskov V.E., Neverov V.A.*

The Turner Scientific and Research Institute for Children's Orthopedics, Saint-Petersburg, Russian Federation

**Total hip replacement in children is performed according to very limited and compelling indications. The principal of such a treatment is the complete and irreversible destruction of the hip joint accompanied by a permanent loss of function of the lower limb. Hip replacement in children with cerebral palsy is a very rare method of treatment. According to observations from the Turner Institute, it was performed in only 2% of all replacement cases. After the placement of an artificial joint, the atherogenic component of the contractures disappears and improves the motor activity of patients. In this paper, a 3-year follow-up of the bilateral total hip replacement in a child with cerebral palsy and bilateral secondary stage III coxarthrosis is presented.**

**Keywords:** cerebral palsy; coxarthrosis; total hip replacement.

Total hip replacement is rarely employed in children with hip disorders [1], and its use in children with cerebral palsy is even rarer. We have not identified any reports on this problem in the Russian literature; however, such cases have been reported in the foreign scientific literature [2, 3].

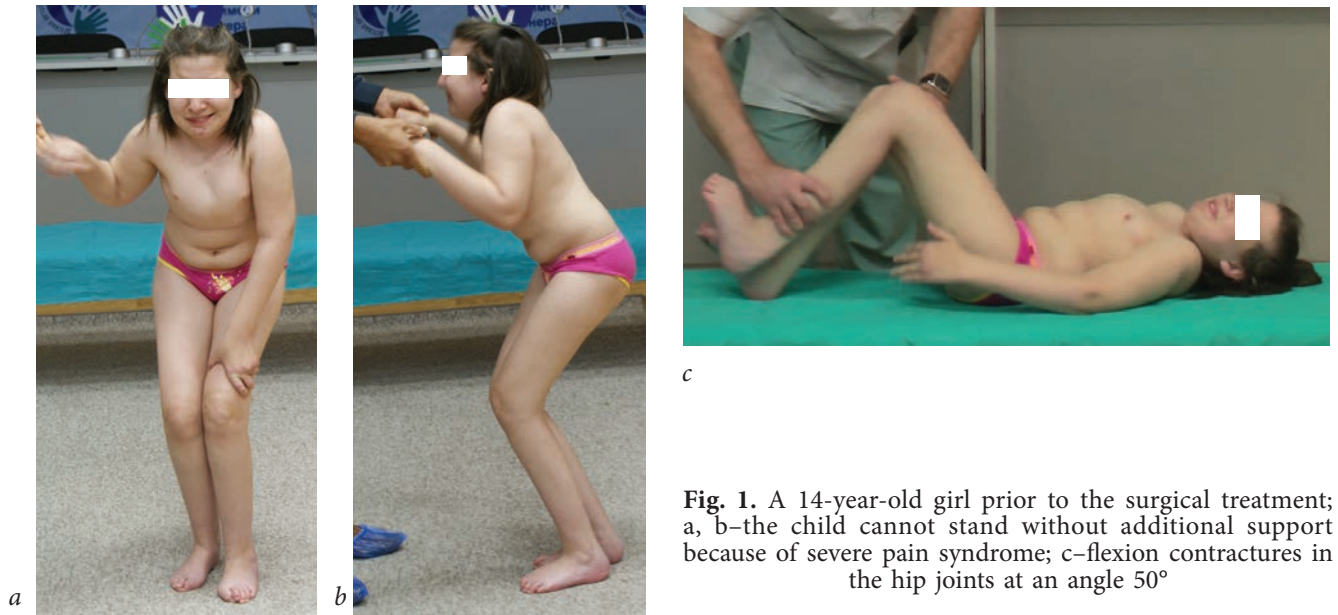
We encountered two children with cerebral palsy who underwent total hip replacement at the G.I. Turner Research Institute for Pediatric Orthopedics (RIPO) clinic; this accounted for 2% of all cases of hip replacement surgery in our practice. One child underwent phased bilateral replacement. This case is reported below.

Patient R., a 14-year old female was admitted to the clinic in 2010 with a diagnosis of cerebral palsy, spastic diplegia, and stage 3 bilateral secondary coxarthrosis (caused by avascular necrosis of the femoral heads). She had severe hip joint pain on standing and sitting, which precluded the possibility of independent walking and restricted her to a wheelchair. She was not capable of walking more than 10 steps with support and sitting more than 30 min. There were flexion-adduction contractures of the hip joints at angles of 50° and 0°, respectively. Active and passive motions in the hip joints (swaying) ranged from 10° to 15° and were sharply painful in the extreme positions. Self-care was significantly

hampered; she could not dress in a skirt, pants, socks, and shoes without assistance (Fig. 1a, b, c). Radiographs showed deformed subluxated femoral heads; a bone covering of approximately two-thirds; a narrowed and uneven joint space all along; and significant degenerative phenomena in the femoral head and the acetabulum, in the form of sclerotic areas and multiple cysts (Fig. 2).

The patient was born following a normal first pregnancy. Cerebral palsy was diagnosed at 1.5 years of age, after the beginning of independent walking. The patient underwent conservative treatment. Since 2010, she had suffered from recurrent pain in the hip joints under load. The clinical picture worsened over time. She had not received specific community-based treatment and sought medical attention at our clinic in 2012. A decision was made to perform a phased total bilateral hip arthroplasty given the clinical and radiological picture. Replacement of the left hip was performed in 2012.

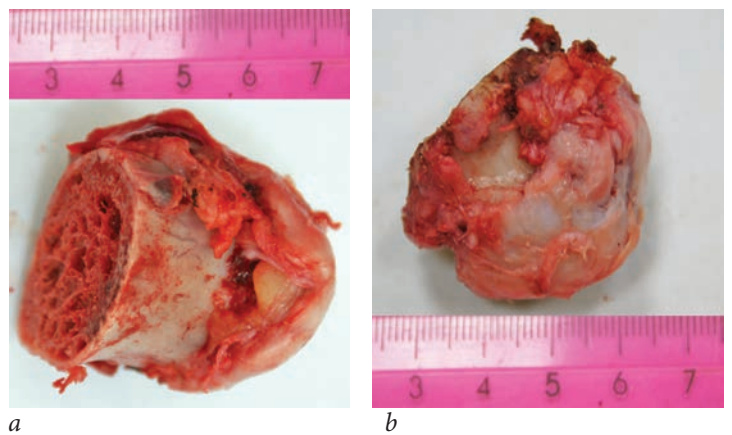
Intraoperatively, we observed pronounced scars; adhesion between the femoral head and the floor of acetabulum; uneven articular surfaces of the head and cavity; and a lack of cartilage covering on approximately half of the articular surface of the femoral head (Fig. 3a). Cementless Zweymuller endoprosthesis with a screw cup was implanted.



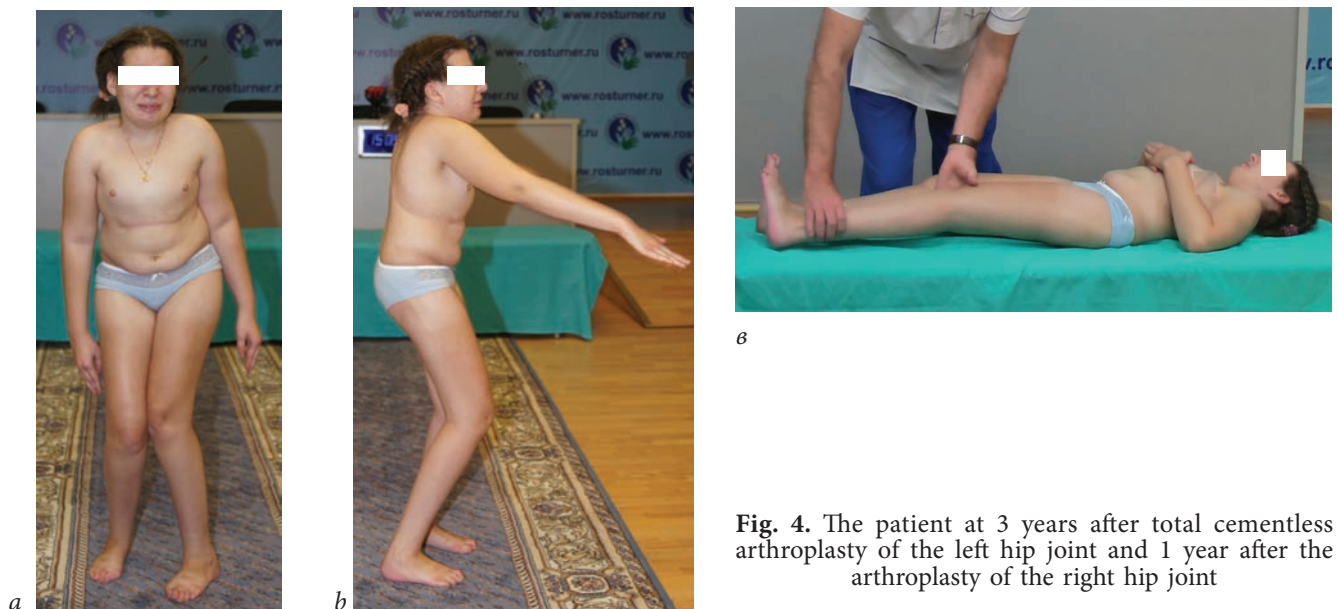
**Fig. 1.** A 14-year-old girl prior to the surgical treatment; a, b—the child cannot stand without additional support because of severe pain syndrome; c—flexion contractures in the hip joints at an angle 50°



**Fig. 2.** Radiographs of the patient before the surgery. There are significant degenerative and dystrophic changes in the hip joints



**Fig. 3.** Macroscopic preparations of the femoral heads; a—left femoral head; b—right femoral head. Pronounced scarring and degenerative changes of hyaline cartilage



**Fig. 4.** The patient at 3 years after total cementless arthroplasty of the left hip joint and 1 year after the arthroplasty of the right hip joint



**Fig. 5.** Radiographs of the patient 3 years after total cementless arthroplasty of the left hip joint, and 1 year after arthroplasty of the right hip joint using Zweymüller implant

The following friction pair was used: an acetabular insert consisting of high-molecular-weight polyethylene and a metal head consisting of cobalt-chromium alloy.

The choice of this implant was primarily conditioned by the design of the acetabular component. The screw cup provides stable fixation, even in cases in which only two-thirds of its surface is in contact with the bone. In this example, this was important because the patient was thin and had pronounced bone weight deficiency in the acetabular region of the pelvis. We used the smallest size of the acetabular component of the endoprosthesis (diameter, 35 mm). This in turn led to implantation of the smallest metal head (diameter, 22 mm).

The postoperative period was uneventful. On the third day after the operation, the patient was allowed to walk with a walker with partial loading (25% of body weight) of the left lower limb. Physical therapy sessions were initiated and aimed at exercising the left hip joint. Walking with a full load was allowed 3 months after the operation.

Replacement of the right hip joint was performed after 2 years. The intraoperative macroscopic picture was similar to that of the left hip joint (Fig. 3b).

The clinical picture 3 years after the arthroplasty of the left hip joint (i.e., 1 year after the arthroplasty of the right hip joint) was as follows: the patient walked independently without support and with a spastic gait. There were no complaints of pain while walking or sitting. The flexion contractures of the hip joints were almost completely eliminated. Self-care abilities had significantly improved; the patient was capable of dressing herself in a skirt or pants, socks, and shoes without assistance (Fig. 4a, b, c). Radiographs revealed the stable position of the implant components (Fig. 5).

## Conclusion

The case reported in this article demonstrates that hip replacement is possible and indicated in children with cerebral palsy and secondary coxarthrosis in the case of irreversible deformations and destruction of the hip joint.

## References

1. Неверов В.А., Камоско М.М., Басков В.Е. Эндопротезирование тазобедренного сустава у детей и подростков // Вестник хирургии им. И.И. Грекова. – 2011. – № 6. – С. 107–112. [Neverov VA, Kamosko MM, Baskov VE. Endoprotezirovanie tazobedrennogo sustava u detei i podrostkov. *Vestnik khirurgii im. I.I. Grekova*. 2011;6:107-112. (In Russ).]
2. Raphael BS, Dines JS, Akerman M, Root L. Long-term followup of total hip arthroplasty in patients with cerebral palsy. *Clin Orthop Relat Res*. 2010;468(7):1845-54. doi: 10.1007/s11999-009-1167-1.
3. Sanders RJ, Swierstra BA, Goosen JH. The use of a dual-mobility concept in total hip arthroplasty patients with spastic disorders: no dislocations in a series of ten cases at midterm follow-up. *Arch Orthop Trauma Surg*. 2013;133(7):1011-6. doi: 10.1007/s00402-013-1759-9.

## РЕЗУЛЬТАТ ДВУСТОРОННЕГО ТОТАЛЬНОГО ЭНДОПРОТЕЗИРОВАНИЯ ТАЗОБЕДРЕННЫХ СУСТАВОВ ПРИ ЛЕЧЕНИИ РЕБЕНКА С ДЦП

© *Басков В.Е., Неверов В.А.*

ФГБУ «НИДОИ им. Г.И. Турнера» Минздрава России, Санкт-Петербург

Тотальное эндопротезирование тазобедренного сустава у детей выполняется по очень ограниченным и строгим показаниям, ведущим из которых является полная и необратимая гибель тазобедренного сустава, сопровождающаяся стойкой утратой функции нижней конечности. Эндопротезирование тазобедренного сустава у детей с детским церебральным параличом является еще более редким способом лечения и, по наблюдениям «НИДОИ им. Г.И. Турнера», выполнялось лишь в 2 % от всех случаев эндопротезирования. После установки искусственного сустава исчезает артрогенный компонент контрактур, что положительно сказывается на двигательной активности пациентов.

В данном сообщении приводится трехлетний результат двустороннего тотального эндопротезирования тазобедренного сустава у ребенка с детским церебральным параличом и двусторонним вторичным коксартрозом III стадии.

**Ключевые слова:** ДЦП, коксартроз, эндопротезирование тазобедренного сустава.

### *Information about the authors*

**Baskov Vladimir Evgenievich** — MD, PhD, head of the department of hip pathology. The Turner Scientific and Research Institute for Children's Orthopedics. E-mail: dr.baskov@mail.ru.

**Neverov Valentin Aleksandrovich** — MD, PhD, professor, leading research associate of the department of hip pathology. The Turner Scientific and Research Institute for Children's Orthopedics. E-mail: 5507974@mail.ru

**Басков Владимир Евгеньевич** — к. м. н., руководитель отделения патологии тазобедренного сустава ФГБУ «НИДОИ им. Г. И. Турнера» Минздрава России. E-mail: dr.baskov@mail.ru.

**Неверов Валентин Александрович** — д. м. н., профессор, ведущий научный сотрудник отделения патологии тазобедренного сустава ФГБУ «НИДОИ им. Г.И. Турнера» Минздрава России. E-mail: 5507974@mail.ru.