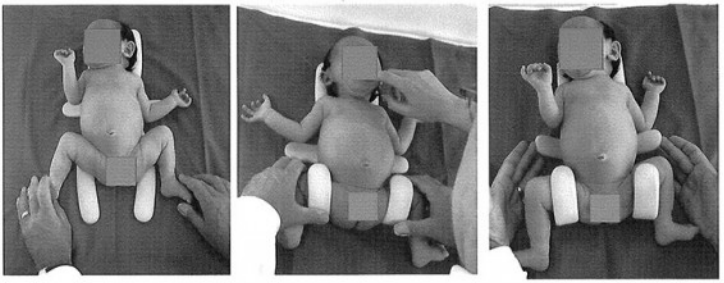
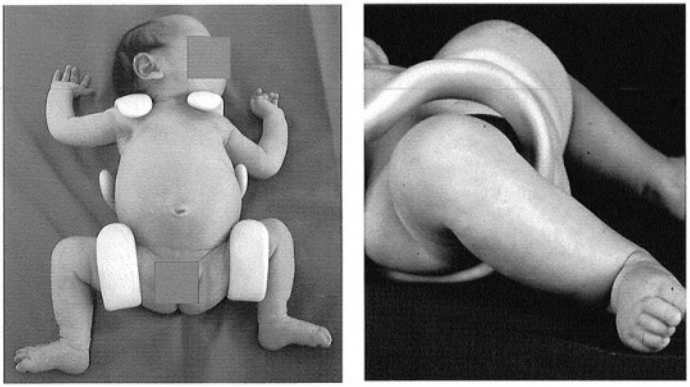
Application of the Original von Rosen splint





The hips must be flexed more than 90 degrees and abducted 60-70 degrees.
Some hip motion must be possible in the splint and forced abduction be avoided.

Manufacturer of the Original von Rosen splint

ISAKSSONS GUMMIFABRIK AB

Ängalagsvägen 226,

SE-269 95 Båstad

Sweden

Phone: +46 431 36 31 60 Fax: +46 431 36 31 82

E-mail: isakssons@bjarenet.com

www.originalvonrosen.com

The Original von Rosen splint

The Original von Rosen splint was designed by the late Professor Sophus von Rosen of Sweden in 1956 for newborn infants with unstable hips. The splint has been used nationwide in Sweden for more than 50 years with the aim of preventing the development of permanently displaced hips in children born with unstable hips. So far 926 patients treated in the splint have been reviewed in the literature. When treatment is commenced during the first week of life and the splint is applied correctly and treatment is monitored by weekly control in outpatient clinics, the reported success rate has been over 95 % and the incidence of avascular necrosis of the femoral head - AVN - less than 1 %. To achieve these results the following points must be considered:

A. Application of the splint

1. To maintain concentric reduction of the femoral head in the acetabulum the hips must be flexed more than 90 degrees and abducted 60 - 70 degrees.
2. To prevent development of avascular necrosis of the femoral head - AVN - some hip motion must be possible in the splint and forced abduction avoided.

B. Routines for seeing the children in the outpatient clinic

1. The children should be seen once a week in the clinic by a nurse to:

   A. Check that the splint is positioning the hips correctly and if the splint should be changed to a larger size (7 sizes).

   B. Have a bath. C. Rule out skin problems. D. Give the parents general advice.

2. Ultrasonograms of the hips must be obtained after 4-6 weeks´ treatment in the splint.

3. Treatment lasts for 6-12 weeks depending on the initial degree of hip instability and what ultrasound reveals after 6 weeks´ treatment.

C. Advice for parents

1. The parents should not remove the splint at home.
2. The child should lie on its back and not on its tummy.
3. When washing the child remaining in the splint, use unperfumed soap.
4. After washing, carefully wipe the skin dry with a towel.
5. Powdering the child and the splint with a thin layer of unperfumed powder.
6. Change diapers frequently.
7. The parents should contact the clinic if they have any problems with the splint.

References

Fredensborg N.(1976) The results of early treatment of typical congenital dislocation of the hip joint in Malmö. J. Bone Joint Surg Br vol 58-B, No 3, August:272 – 278.

Hansson G. et al (1983). Screening of children with congenital dislocation of the hip joint on the maternity wards in Sweden. J Pediatr Orthop, 3(3): 271-279.

Heikkila E. (1988) Comparison of the Frejka Pillow and the Von Rosen splint in the Treatment of Congenital Dislocation of the Hip. J Pediatric Orthop 8:20-21.

Wilkinsson A.G. et al .(2002) The efficacy of the Pavlik harness, the Craig splint and the von Rosen splint in the management of neonatal dysplasia of the hip. A comparative study. J Bone Joint Surg Br; 84(5): 717-19.

EDITOR

Associate Professor Göran Hansson, MD, PhD

The Queen Silvia Children's Hospital

Gothenburg

Sweden

The Original von Rosen splint

The Original von Rosen splint was designed by the late Professor Sophus von Rosen of Sweden in 1956 for newborn infants with unstable hips. The splint has been used nationwide in Sweden for more than 50 years with the aim of preventing the development of permanently displaced hips in children born with unstable hips. So far 703 patients treated in the splint have been reviewed in the literature (Table 1). When treatment is commenced during the first week of life and the splint is applied correctly and treatment is monitored by weekly control in outpatient clinics, the reported success rate has been over 95 % and the incidence of avascular necrosis of the femoral head - AVN - less than 1 %. To achive these results the following points must be considered.

1. The children must be seen once a week in the outpatient clinic by a nurse to

A. Check that the splint is positioning the hips correctly.

B. Decide if the splint should be changed to a larger size (7 sizes).

C. Rule out skin problems.

D. Have a bath.

E. Give the parents general advice.

2. Ultrasonograms of the hips must be obtained after 6 weeks' treatment in the splint to

A. Rule out persistent displacement of the femoral head (extremely rare).

B. Decide for how long the child should be treated in the splint.

3. Treatment lasts for 6 – 12 weeks

A. Children with primarily dislocated or dislocatable hips should be treated for 12 weeks.

B. Children with primarily subluxatable hips and normal ultrasonograms at 6 weeks should be treated for 6 weeks.

C. Children with a family history of DDH should be treated for 12 weeks.

Sizes of the Original von Rosen splint

1. Mini 2. Small-1 3. Small-2 4. Medium 5. Large-1 6. Large-2 7. Extra large.

Of all Original von Rosen splints used, Small-2 and Medium account for 65 %.

For the hips to develop normally in the treatment of children with NHI in the Original von Rosen splint, strict and careful routines must be practiced.

B. How to successfully monitor treatment in the Original von Rosen splint

The Original von Rosen splint, which was designed ONLY for newborn infants with NHI, has in several studies been documented to be a reliable brace for these children.

In order to achieve a success rate of 95 % and less than 1% risk of development of AVN when using the Original von Rosen splint, which has been achieved both in Malmö and in Gothenburg, the following points must be considered:

1. The splint must position the hips in more than 90 degrees of flexion and 60 - 70 degrees of abduction.

2. To prevent adverse effects of treatment like AVN, some hip motion must be possible in the splint and forced abduction be avoided.

3. The parents should not be allowed to remove the splint at home.

4. The child must be seen in "the hip clinic" once a week by a nurse to:
    1. Check that the splint is correctly applied.
    2. Decide when it is time to change the splint to a larger size.
    3. Ensure that no "skin problems" have occurred.
    4. Have a bath.
    5. Give the parents general advice.

5. The parents should be able to get in touch with a nurse at the hip clinic on the phone if they are having problems with keeping the child in the splint.

6. After 6 weeks of treatment, the child must be seen again by a physician and static ultrasonograms of the hips be obtained to rule out the possibility that the hips are still displaced (which is extremely rare and often not possible to detect by clinical examination). These ultrasonograms can also be used as a helpful tool to decide if the child should be treated for 6 or 12 weeks in the splint.

7. Children with primarily dislocated or dislocatable hips should be treated for 12 weeks.

8. Children with primarily subluxatable but not dislocatable hips and normal ultrasonograms at 6 weeks should be treated for 6 weeks.

9. Children with a family history of DDH should be treated for 12 weeks.

10. Final radiographs of the hips should be obtained after the child has started to walk and no later than at the age of 12 months.

This treatment regime, lasting for 6-12 weeks, may seem complicated to follow. However, compared to what will be the case when the diagnosis DDH is established late and long periods of treatment in a hip spica and/or surgery are usually needed, there is a considerable gain to achieve both from the treatment point of view as well as with regard to the possibility of getting the hip joints to develop in a normal manner when treatment in the Original von Rosen splint is commenced at birth.

Efficacy of the Screening Program for Hip Instability in Newborn Infants on the Maternity Wards in Sweden

In Sweden, with a population of 9.5 million and 100.000 deliveries each year (Fig. 1), the incidence of children with developmental dysplasia of the hip (DDH) has been estimated to 1-2 per thousand live births (15). Screening for children with neonatal hip instability (NHI), who run a risk of developing displaced hips, has been practiced by the paediatricians on the maternity wards for more than 50 years (without the use of hip ultrasonography) (5-8,13). Prior to commencement of the screening program in the 1950s between 100 and 120 late diagnosed cases of DDH were referred to the orthopaedic departments each year (Fig. 2). In almost all these children the diagnosis was established after the first year of life and less than 4 % of the hips "developed well" when treated by the methods used at that time (14). Since the early 2000s the number of late diagnosed cases has declined to about 15 cases each year (Fig. 2) (2). These figures show that in about 90 % of the children with DDH the diagnosis nowadays is established before children are discharged from the maternity wards. Further, of the late diagnosed cases "missed" at the primary screening on the maternity wards, about 80 % are now picked up during the first 6 months of life at the Child Health Clinics (13). When the diagnosis has been established this early in children with late diagnosed DDH the reported success rate when treating these children, in the great majority by closed reduction, has been over 90 % in Sweden (16).

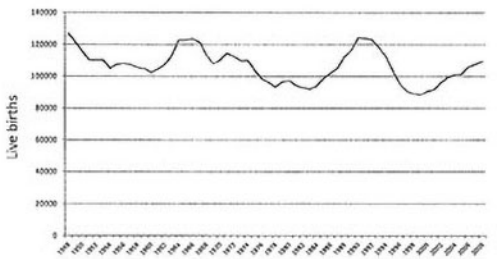


Figure 1. Live births in Sweden, 1948-2008.

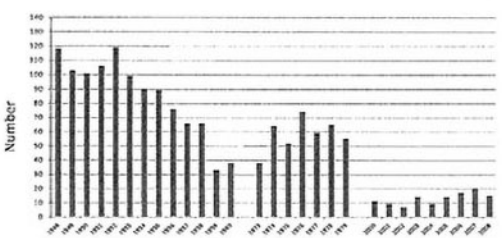


Figure 2. Number of late diagnosed cases of DDH in Sweden, 1948-1960, 1973-1979 and 2000-2008 (2, 14).

In about 90% of children with DDH in Sweden, the diagnosis is established on the maternity wards.