



# Epidemiology and Screening of Developmental Dysplasia of the Hip in Europe: A Scoping Review.

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## **Abstract:**

Developmental Dysplasia of the Hip (DDH) includes a wide range of deformities of the hip, such as congenital dysplasia, subluxation, and dislocation. It is usually identified through neonatal screening during the first 6-8 weeks of life. The incidence of DDH ranges from 1–7% in neonates among some populations but this may vary among different ethnicities and countries.

The aim of this study is to summarize the existing data regarding the incidence of DDH and screening tests among European countries.

This study is a scoping review of the literature.

The incidence of DDH presents fluctuations, not only among European countries, but also within the same country. A consensus about the ideal age for screening has not been reached to date and there is no unanimity regarding the screening methods of DDH in Europe (universal screening methods vs. screening of high-risk cases).

More robust data is needed to conclude which screening approach is associated with improved long-term outcomes.

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## **Introduction:**

Developmental Hip Dysplasia includes a wide range of deformities of the hip, such as congenital dysplasia, subluxation, and dislocation. It is usually identified through neonatal screening during the first 6-8 weeks of life. The incidence of DDH ranges from 1–7% in neonates among some populations but this may vary among different ethnicities and countries. A consensus about the ideal age for screening has not been reached to date. Timely diagnosis through the assessment of risk factors, physical examination, and the correct use of imaging techniques can lead to appropriate early treatment and therefore to the prevention of certain complications of DDH long-term sequelae, such as dislocation of the hip, avascular necrosis of the femoral head and degenerative osteoarthritis. Across the globe and particularly in Europe, there are different screening programs at national level. This can be explained by the lack of universal instructions regarding the screening methods for DDH. Screening recommendations for DDH vary significantly from country to country. Some bodies recommend screening of all infants, whereas others recommend screening of high-risk children [1].

## **Aim:**

The aim of this study is to summarize the existing data regarding the incidence of developmental hip dysplasia and screening tests among European countries.

## **Material and methods:**

The authors conducted a systematic searched in PubMed/Medline and Scopus and included original studies published in English, French or German.

## **Results:**

### Epidemiological studies

The incidence of DDH in Europe ranged from 0,59 per 1000 live births to 27,53 per 1000 live births, which was the maximum limit of incidence of DDH in Europe, observed in Hungary. Furthermore, incidence ranged significantly also in Greece, especially in Crete, as it was reported to be 10.83 per 1.000 live births . Differences in the rates of DDH can be observed not only among different countries in Europe, but also between different areas in the same country; for example, the incidence of DDH diagnosed in newborns varied between three hospitals in Northern Sweden. The incidence was 10.0, 7.1 and 3.5 per 1.000 live births in different hospitals. Unfortunately, very few epidemiological studies have examined the incidence of DDH and due to the insufficient data, we cannot draw general conclusions regarding the incidence of DDH in Europe.

The effect of certain risk factors was also studied regarding their association with the development of DDH, namely, multiple pregnancies, increased gestational age, birthweight, and experience/ competence of the physician in performing the neonatal screening tests for DDH. Rühmann et al. observed a correlation between heredity and breech presentation and the need for open procedure for DDH. Rosendahl et al. concluded that breech presentation during birth appeared to be significant risk factor affecting females only and having a sibling or a parent with DDH was a more significant risk factor for the appearance for DDH, than having a second or third degree relative with DDH .

### DDH Screening

There is no consensus regarding the appropriate screening methods for DDH in Europe as well as the age at which screening should be performed. Most studies recommend sonographic and/or clinical assessment as a screening tool. The use of ultrasound in selected groups has also been proposed. Salut et al. suggested the use of ultrasound for a high-risk group, namely 30 days old female neonates. However, ultrasonography can also present certain limitations; Muresan et al. found that the most frequent stage of DDH detected through ultrasound was type IA, and the rarest stage was III. The incidence of hip dysplasia stage III diagnosed with ultrasound examinations in the central region of Romania was 0.2% .As far as radiography is concerned, it seems not to be preferred as a screening tool. Nevertheless, it could be used in the context of screening at four months of age for babies at increased risk of DDH who had been normal at birth. Wenger et al. examined the radiographic outcomes at 1 year of life in newborns undergoing early treatment for neonatal hip instability. It was found that even in newborns who are diagnosed and treated, the radiographic differences may remain after one year of life.

The above results reflect the reality that exists in Europe regarding DDH epidemiology and screening.

## **Conclusion:**

The incidence of DDH presents fluctuations, not only among European countries, but also within the same country. There is no unanimity regarding the screening methods of DDH; in some countries universal ultrasound is proposed as the basic screening methods of neonates for DDH; in other countries screening is performed only in high-risk cases. More robust data is needed to conclude which screening approach is associated with improved long-term outcomes.

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