Positional Cranial Asymmetry in Preterm Infants:

Implementation of Best Practices in an Italian Neonatal Unit

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Background

Prolonged head contact with flat and rigid mattresses, combined with immature postural control, can lead to early positional cranial asymmetries in newborns. Preterm infants are at increased risk due to reduced cranial bone mineralization and limited positional variability related to autonomic instability and respiratory conditions.
The most common deformity in this population is **positional dolichocephaly**, while **positional occipital plagiocephaly (POP)** tends to worsen over time, identifying preterm infants as a particularly vulnerable group. Preventive strategies during NICU stay include regular repositioning and the use of postural supports.

Aim

To reduce the **incidence and severity of positional dolichocephaly and plagiocephaly** in preterm infants through the introduction of **customizable positioning pillows** integrated into standard postural care.

Setting

The project was conducted in the Neonatal Unit of ASMN, the only NICU in the province of Reggio Emilia (Italy), with 18 beds (6 NICU, 12 intermediate care).
A previous 16-months observational study reported an incidence at discharge of **60% dolichocephaly** and **90% plagiocephaly**.

Methods

Preterm infants with birth weight <1500 g and/or gestational age <32 weeks were enrolled.
The intervention included:

- Standard repositioning every 3 hours
- Introduction of a customizable positioning pillow
- Training of nursing staff and parental involvement

Cranial shape was monitored every 7–10 days until discharge using the **Oblique Diameter Difference Index (ODDI)** and **Cranial Index (CI)**.

Project Phases

1. **Staff training (3 months)**: five 90-minute sessions led by an experienced pediatric physiotherapist.
2. **Implementation and monitoring (12 months)**: gradual introduction of pillows, individually adapted and supervised by physiotherapists.
3. **Follow-up (12 months)**: continued enrollment, monitoring, and staff support.

Results

At discharge, **plagiocephaly incidence decreased from 90% to 77%**, and further to **70%** at follow-up.
Severity improved, with an increase in mild forms (65%) and a reduction in moderate forms (15%); no severe cases were observed.
Dolichocephaly incidence decreased from 58% to 42%, with a partial increase during follow-up.

Conclusion

The integration of regular repositioning and customizable postural supports effectively reduced the incidence and severity of cranial asymmetries, particularly plagiocephaly. The intervention became part of routine nursing care with physiotherapist supervision, improving staff awareness and preventive management of cranial deformities in preterm infants.

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