

Using the infant inversion test (Peiper-Isbert Reaction)

COMMITTEE ON CHIROPRACTIC PAEDIATRIC DIAGNOSTIC AND THERAPEUTIC PROCEDURES – FEB 2019

Background information

Inversion testing of the infant is used within the medical,ⁱ physiotherapy and chiropractic professions as part of the neurological examination.

Inversion testing as part of the neurological examination in infants has been well described.ⁱⁱ Concerns have been raised about possible negative outcomes as a result of performing an inversion test on an infant. The possibility of side effects such as retinal detachment, detrimental effects on hip dysplasia and increased intracranial pressure with possible intracranial bleeding have been raised, however no reports of negative outcomes using an inversion test on infants have been published.

This policy document serves to inform members of the Australian College of Chiropractic Paediatrics (ACCP) and the broader chiropractic profession of the appropriate clinical application and evidence based diagnostic implications of the observation and use of the Peiper-Isbert reaction as well as contraindications to the use of inversion tests in infants.

The Peiper-Isbert reaction is one of seven standard postural reactions tested. Typically, they are tested in the following order as they place increasing demands on the infant:ⁱⁱⁱ

- | | |
|--------------------------|---|
| 1. Traction test | 5. Collis horizontal suspension |
| 2. Landau reaction | 6. <i>Peiper-Isbert vertical suspension</i> |
| 3. Axillary suspension | 7. Collis vertical suspension |
| 4. Vojta's tilt reaction | |

The Peiper-Isbert vertical suspension is tested by placing the examiner's hands around each upper leg of the infant and suspending the infant in the vertical position with the head directed downwards.^{iv} Abrupt movements when doing the test should be avoided.

The Peiper-Isbert reaction was found significantly abnormal in spastic and athetoid children from the 1st month ($P < 0.001$), in children with developmental retardation from the 3rd month ($P < 0.01$) and in ataxic children at the 11th month of life ($P < 0.01$).^{iv}

Children with five or more abnormal postural reflexes at the 1st month of life were significantly correlated with the development of either spastic or athetoid CP; three or less abnormal postural reflexes were statistically correlated with a normal outcome ($P < 0.001$).^{iv}

A recent review of neurological signs with data allowing for the calculation of predictive values in infants at risk for developmental disorders found one paper relating to the Peiper-Isbert reaction.^v

Chiropractors have attempted to use the Peiper-Isbert reaction as an indicator of spinal dysfunction however no published data other than anecdotal comments were found.

Conclusions and recommendations:

1. The Peiper-Isbert reaction is a well-accepted component of the neurological examination of the neonate and infant and is one of several postural reactions tested to assist with the early diagnosis of cerebral palsy.
2. The Peiper-Isbert reaction testing is indicated if there is clinical concern of cerebral palsy or developmental retardation in a neonate or infant or if the neonate is considered at high risk of developing cerebral palsy or developmental retardation.
3. The neurological findings or clinical indicators raising the concern of increased risk of cerebral palsy or developmental retardation should be documented prior to testing the Peiper-Isbert reaction which is expected to be assessed as part of several postural reactions.
4. The Peiper-Isbert reaction or any other test involving inversion of the infant should not be tested if a relative contraindication is known or suspected.
5. There is no evidence to support the using the Peiper-Isbert reaction or other inversion tests to assist with assessment or identification of spinal dysfunction in the neonate or infant.



Relative contraindications to using the Peiper-Isbert reaction or any other inversion test on infants

1. Coagulation disorders
2. Increased risk of retinal detachment
3. Respiratory distress
4. Cranial and spinal birth trauma
5. Hip dysplasia

Relative contraindications to the use of inversion tests in children have previously been published.^{vi}

Coagulation disorders

The functional immaturity of neonatal pro and anticoagulant proteins demonstrates that the haemostatic system is set differently to adults and under normal circumstances the infant is not at increased risk of either haemorrhage or thrombosis.^{vii}

Coagulation disorders include but are not limited to:

1. Congenital haemorrhagic diseases (Haemophilia A and B, Type 3 von Willebrand disease)
2. Congenital platelet disorders (Glanzmann thrombasthenia)
3. Acquired haemorrhagic diseases (Disseminated intravascular coagulopathy, Vitamin K dependent bleeding)
4. Thrombocytopenia

Retinal detachment

Increased risk of retinal detachment may be present with:

- | | |
|-------------------------------|------------------------|
| 1. Diabetes | 4. Coats disease |
| 2. Sick cell disease | 5. Retinoblastoma |
| 3. Retinopathy of prematurity | 6. Ocular inflammation |

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Braden Keil BAppSc(Chiro) MCSc(Paediatrics) FICC FACCP

Melissa Neave BSc(Hons) MChiro DACCP

Jenelle Bourgeois-Bell BHSc(Hons) DC DACCP

Stefan Kohlhoff BSc MChiro DACCP

Adam Epskamp BChiro BSc(Chiro) DACCP

Christian Fludder BChiroSc MChiro DACCP

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ⁱⁱ Zafeiriou, D. I. (2004). Primitive reflexes and postural reactions in the neurodevelopmental examination. *Pediatric Neurology*, 31(1):1-8

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^{iv} Zafeiriou, D. I., Tsikoulas, I. G., Kremenopoulos, G. M., & Kontopoulos, E. E. (1998). Using postural reactions as a screening test to identify high-risk infants for cerebral palsy: a prospective study. *Brain & Development*, 20:307-311.

^v Hamer, E. G., & Hadders-Algra, M. (2016). Prognostic significance of neurological signs in high-risk infants - a systematic review. *Developmental Medicine & Child Neurology*, Suppl 4:53-60

^{vi} Vallone, S. a., Miller, J., Larsdotter, A., & Barham-Floreni, J. (2010). Chiropractic approach to the management of children. *Chiropractic and Osteopathy*, 18:16

^{vii} Campbell, S. E., & Bolton-Maggs, P. H. (2015). Congenital and acquired bleeding disorders in infancy. *Early Human Development*, 91(11):637-642.

