

# Usefulness of 'Babkin Reflex' in normal term Indian infants

Benakanal S.V.<sup>1</sup>, Kumar V.S.<sup>2</sup>, Patil R.B.<sup>3</sup>

<sup>1</sup>Dr Shreeshail V. Benakanal, Assistant Professor, Department of Paediatrics, Shivamogga Institute of Medical Sciences, Shivamogga, <sup>2</sup>Dr Vikram S. Kumar, Associate Professor, Department of Paediatrics, Subbaiah Institute of Medical Sciences Shivamogga; both author are Affiliated with Rajiv Gandhi University of Health Sciences, Bangalore, <sup>3</sup>Dr Ravindra B. Patil, Professor of Paediatrics, Shivamogga Institute of Medical Sciences, Shivamogga, Karnataka, India.

**Correspondence Author:** Dr Vikram S. Kumar, Department of Pediatrics, Subbaiah Institute of Medical Sciences Shivamogga, Karnataka, India.

## Abstract

**Background:** The Babkin Reflex belongs to the group of rarely defined and used primitive reflexes, being easily elicited in normal newborns during wakeful state particularly before feeding. To the best of our knowledge there have been no studies in India about the validity and usefulness of this reflex. **Aim:** The purpose of this study was to observe the consistency in duration of appearance and disappearance of the reflex in normal Term infants. **Settings and Design:** Hospital based, prospective, observational, longitudinal, single ethnicity study. **Method:** A prospective observational study was conducted to study the Babkin reflex in two thousand normal infants and also analyzed the average time of disappearance of the reflex. Descriptive statistics with rate were used. **Results and Conclusion:** In normal term infants, the Babkin reflex can be elicited from the time of birth, becomes increasingly suppressed with age, and disappears in the great majority by the end of the fifth month of age. Babkin reflex is surprisingly a fairly consistent primitive reflex which can be used as a screening reflex in all infants. Persistence of this reflex beyond 5 months of age mandates frequent neurological assessment.

**Keywords:** Babkin reflex, Term infants, India

## Introduction

The Babkin reflex-opening of the mouth and flexion of the arms in response to stimulation of the palms is a less well known reflex in normal infants. The Babkin Reflex belongs to the group of primitive reflexes, being easily obtained in normal newborns during wakeful state particularly before feeding.

This reflex was first mentioned in Russian literature in 1953 by Babkin but only began to draw attention in 1960, on the occasion of translation of his work to English literature [1].

Persistence beyond the usual age of disappearance has diagnostic value and warrants neurologic investigation [2].

The emphasis given to a reflex or any motor response in a neurologic evaluation depends on what is known about this item and on the possibility of associating it with specific pathologies, as is the case with the plantar support reflex, asymmetric tonic neck reflex, and tonic labyrinth reflex in the early diagnosis, rehabilitation, and prognosis of cerebral palsy [3].

## Methods

It was a prospective observational study conducted in outpatient section of Department of paediatrics, Shivamogga Institute of Medical Sciences, Shivamogga, Karnataka and Department of paediatrics, Subbaiah Institute of Medical Sciences, Shivamogga, Karnataka. The study was approved by the local ethics committee and a written informed consent was obtained from the parents / guardians of all the children. Babies born in different local hospitals were recruited in the study.

Manuscript received: 04<sup>th</sup> May 2019

Reviewed: 14<sup>th</sup> May 2019

Author Corrected: 19<sup>th</sup> May 2019

Accepted for Publication: 24<sup>th</sup> May 2019

A total of 2780 babies were enrolled, out of which 2000 (participation rate-72%) completed the study. The children were examined once on the duty of the authors, by requiring them to be quiet, just before feeds and supine. Because this was a reflex that most of the authors were unaware of, it took sometime before all of us were confident in eliciting the reflex. Initially, two examiners were required, one to give the stimulus and observe the responses, and the other to write down the response of the infant. After each stimulus, we interrupted the study to write down the response. With experience, one examiner with an assistant was sufficient. Hospital deliveries of term, Appropriate for gestational age babies born by vaginal delivery with an APGAR score of more than 7 at 1 minute conducted by an Obstetrician and attended by a paediatrician were included in the study. Term babies born by assisted vaginal deliveries (forceps or vacuum application) and by elective/emergency caesarean section delivery were not included in the present study. Data were analysed using the SPSS Statistics Version 26.

The Babkin reflex in an infant was elicited by the examiner by simultaneously pressing his or her thumbs against both palms of an infant lying on a flat surface in the supine position. Tactile stimulation without pressure and nociceptive stimulation are both ineffective as described in the literature [1]. The prominent response in the reflex noted is opening of the mouth, which is associated with flexion of the forearms and head and closing of the eyes as shown in **figure 1**.

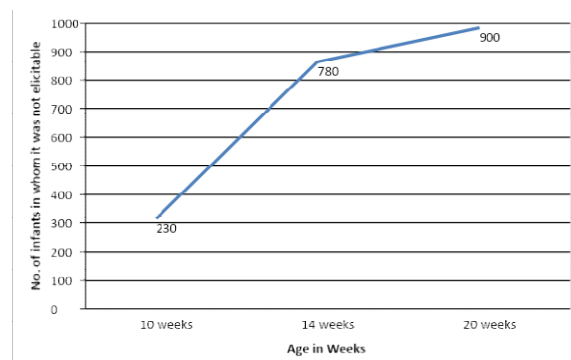


**Fig-1: The prominent response in the reflex noted is opening of the mouth, which is associated with flexion of the forearms and head and closing of the eyes**

If the subject's head faces laterally in the starting position, it may turn to midline when the stimulus is provided. A sudden strong stimulus (pressure) is recommended for a good response of the reflex because the response is dependent on the strength of the applied pressure, to some degree [1]. A unilateral pressure can also sometimes evoke a weak reaction, with turning of the face toward the hand stimulated [2]. The reflex can also be elicited by stimulating the forearms and infraclavicular space near the sternal bone [3,4]. There is some indication of dependence of the response on the state. It tends to be positive in the waking state but negative in the drowsy or sleep state, although it exhibits wide variation, especially in small preterm infants. The Babkin reflex can be by far more easily elicited before feeding than after feeding and cannot be elicited during feeding. The reflex was to be elicited on each baby at least six times i.e., (1) soon after delivery, (2) 24hrs after birth, (3) At 6 weeks, (4) At 10 weeks, (5) At 14 weeks, (6) At 20 weeks.

## Results

The Babkin reflex was demonstrable within 48 hours after birth in all the babies who satisfied the inclusion criteria. This is in accordance with many of the studies published on Babkin reflex. However, the age of disappearance was quite varied as shown in the **Table 1**.



The reflex disappeared (not elicitable) by 10 weeks in 230 babies (out of 2000), by 14 weeks in 780 babies (out of 1770), by 20 weeks in 900 babies (out of 990). The reflex was elicitable beyond 20 weeks in 90 babies, but disappeared by 26-36 weeks in all of them. In other words; **Table 1** show that the reflex was elicitable in all the babies till 6th week of age while it had disappeared in 11.5% of babies by 10th week, 50.5% in 14th week & 95.5% in 20th week. The reflex was present in 4.5% of babies beyond 20th week which finally disappeared by 36th week.

This reflex appears to be phylogenetically very old and ontogenetically very primitive. However, studies concerning the Babkin reflex have been surprisingly few, especially in the English literature and particularly in Indian literature. Therefore, paediatricians in general are not as familiar with the reflex as other well-known primitive reflexes such as the Moro, Atonic neck reflex and grasp reflexes.

By systematic research carried out by us in routine examinations, we were surprised by two things in the newborn, not yet described in the Indian literature: the first, was the observation that the responses to Babkin reflex are quite consistent for a primitive reflex in a normal newborn, and the second was the probable and possible use of this reflex in picking up children with early neurological damage.

These reasons encouraged us to do the study and to extend our observations, quantify the responses and compare them with the results from the previous older studies. We will be performing and comparing these results with other cohort of babies who have been excluded in the present study (i.e. preterm babies, non vigorous neonates at birth, NICU graduates). That would give a better validity to the reflex.

## Discussion

The study of the Babkin reflex in normal term infants has been undertaken by few researchers in the European and South East Asian children, but there are hardly any studies on Indian babies. Most of the studies on Babkin reflex have been quite old.

Their results are fairly consistent regarding the times of the appearance and disappearance of the reflex. Babkin found that the reflex could be elicited from the time of birth, but was suppressed by the third or more frequently by the fourth month of life. Some other authors have also reported that the Babkin reflex disappears by the fourth month of life [4].

A few authors have also concluded that the responses were readily obtained in children who had lower weight, which had higher scores on the state of wakefulness; and lowest scores and implicitly negative responses in the group who was sleeping [5].

Lippmann noted in human newborns that the Babkin reflex consisting of head flexion and mouth opening in response to pressure on the palms of both hands was not obtained during sucking. Since the Babkin reflex is regarded as the rudiment of hand-mouth coordination for preying in animals [2], it appears to be rational that the reflex is unable to be elicited during feeding. Like any other primitive reflex, this reflex, after repeated stimulation, disappears, returning back after some rest. The reflex is usually absent on the affected side, in newborns with traumatic injury of the shoulder plexus.

It may also be absent in infants with circulatory insufficiency in the brainstem, whereas in children with cerebral hemisphere lesions, the reflex is sometimes elicited after 4 months of age. Various studies have shown that Babkin reflex persisting after 6 months of age in children indicates neurological damage [6].

A marked response of the Babkin reflex in the fourth to fifth months of age and the persistence of the response beyond the fifth month of age can generally be regarded as abnormal [7]. On the other hand, there are some normal infants showing no response during the neonatal period or early infancy, as demonstrated in the studies; which indicates that the absence of the response during these periods is not necessarily abnormal.

Infants with these abnormal findings should be carefully observed for the appearance of neurological abnormalities including cerebral palsy and mental retardation. It is most likely that the Babkin reflex is mediated by the reticular formation of the brainstem, which receives inputs from the non-primary motor cortices [1].

In our study, the mouth opening, neck rotation, and lower limb flexion responses were the most frequent, being encountered in the three segments of the upper limb, with mouth opening elicited in 100% which is similar to other studies of the newborns and neck rotation in 90% as of 88.8% in other studies with stimuli to the hand. An extension response of the upper limbs was obtained by stimulation of the three segments

of the lower limb, being encountered in 84% of the infants with stimuli to the foot. The possibility that this extension response of the upper limbs following limb stimulation could be, in reality, Moro's reflex suggests that this technique may be an alternative way of triggering this reflex that could prove useful under conditions of intensive care therapy, in which other maneuvers must often be avoided or limited by the presence of catheters or equipment.

The Babkin reflex is supposedly more easily elicited before feeding than after feeding, which probably implies that this reflex is closely related to food intake.

The Babkin reflex can be phylogenetically regarded as the rudiment of the hand - mouth association for prey in animals. In response to unilateral pressure to the palm, turning of the face toward the hand stimulated with mouth opening is also suggestive of the meaning of the reflex, because it signals the motor behaviour when an animal is about to prey [2-5].

There are a few cutaneous reflexes that are similar to the Babkin reflex in terms of the hand-mouth association or the mode of response (mouth opening), i.e. the palmo-mental and jaw-opening reflexes. The palmo-mental reflex, first described by Marinesco and Radovici, is elicited by stroking the thenar eminence in a proximal to distal direction using a sharp object. The response consists of contraction of the ipsilateral, contralateral, or both mentalis muscles.

The diagnostic value of the palmo-mental reflex is considered to be limited, because the reflex is easily elicited in healthy adults [4]. Persistence beyond the usual age of disappearance has diagnostic value and warrants neurologic investigation.

Children with ASD either skip all this together or show delayed development of many reflex patterns such as Hands Grasp, Hands Pulling, Hands Supporting, Crawling, Asymmetrical Tonic Neck Reflex, Symmetrical Tonic Neck Reflex, BabkinPalmomental, Ocular-Vestibular, and other reflex patterns. Individuals diagnosed with ASD show a chronic lack of sensorymotor integration and delay of skills concerning the early motor milestones [8].

They show a wide range of immature reflex patterns such as ands Pulling, Hands Supporting, Hands Grasp, Crawling, symmetrical Tonic Neck Reflex, Symmetrical Tonic Neck Reflex, BabkinPalmomental, Ocular-Vestibular, and other patterns [9,10].

## Conclusion

Babkin reflex can be a useful primitive reflex which can be used routinely in all the neonatal follow up clinics due to the ease with which it can be performed and the consistency in obtaining the reflex compared to the other neonatal reflexes.

**What this study adds to existing knowledge-** Babkin reflex can be a useful primitive reflex which can be used routinely in all the neonatal follow up clinics due to the ease with which it can be performed and the consistency in obtaining the reflex compared to the other neonatal reflexes.

Babkin reflex may be an alternative to Moro's reflex that could prove useful for detecting neurological disorders.

**Funding:** Nil, **Conflict of Interest:** None initiated

**Perission from IRB:** Yes

## References

1. Futagi Y, Yanagihara K, Mogami Y, Ikeda T, Suzuki Y. The Babkin Reflex in Infants: Clinical Significance and Neural Mechanism. *PediatrNeurol* 2013 Sep 1;49 (3):149-55. Available from: <https://doi.org/10.1016/j.pediatrneurol.2013.04.005>
2. Sheppard JJ, Mysak ED. Ontogeny of infantile oral reflexes and emerging chewing. *Child Dev.* 1984 Jun;55 (3):831-43.
3. Pedroso FS, Rotta NT. From the foot-mouth reflex to the hand-mouth reflex. A continuum of responses to appendicular compression. *ArqNeuropsiquiatr.* 1997 Jun; 55 (2): 186-92.
4. Owen G, Mulley GP. The palmomental reflex: a useful clinical sign? *J NeurolNeurosurg Psychiatry.* 2002 Aug;73(2):113-5. DOI:10.1136/jnnp.73.2.113
5. Futagi Y. The Babkin reflex in infants. 2016;(January 1999).
6. Futagi Y, Abe J, Tanaka J, et al. [The diagnostic value of the Babkin reflex]. *No ToHattatsu.* 1987 Sep;19(5):392-6.
7. Pedroso FS, Rotta NT. Babkin Reflex and Other Motor Responses to Appendicular Compression Stimulus of the Newborn. *J Child Neurol* 2004 Aug 1;19(8):592-6. Available from: <https://doi.org/10.1177/088307380401900805>

Original Research Article

8. SK M, NK A, L S, P S, EA A. Neurosensorimotor Reflex Integration for Autism: a New Therapy Modality Paradigm. *J PediatrNeurolDisord*. 2017;02(01).

9. Blasco PA. Primitive Reflexes: Their Contribution to the Early Detection of Cerebral Palsy. *Clin Pediatr*

(Phila) [Internet]. 1994 Jul 1;33(7):388–97. Available from: <https://doi.org/10.1177/000992289403300703>

10. Futagi Y, Tagawa T, Otani K. Primitive reflex profiles in infants: differences based on categories of neurological abnormality. *Brain Dev*. 1992 Sep;14 (5): 294-8.

.....  
**How to cite this article?**

Benakanal S.V., Kumar V.S., Patil R.B. Usefulness of ‘Babkin Reflex’ in normal term Indian infants. *Int J Pediatr Res*. 2019;6 (05):221-225.doi:10.17511/ijpr.2019.i05.05