

PLANTER REFLEX IN THE NEWBORN

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SUMMARY

Planter reflex in 500 newborns has been studied. It was found to be extensor in majority by solar scratch method. It becomes extensor in greater number of newborns with increasing birth weight and gestational age. The response by Oppenheim's and Gordon's methods was flexor in most of the cases. There was no difference between the response seen in the male and female newborns.

Introduction

The physiological nature of the extensor planter reflex has recently been the subject of considerable debate. Babinski, in 1896, described the pathological planter reflex and also stated that "tickling the foot normally provokes extension in the toes of the newborns." Various studies have been undertaken later, some giving similar opinions while others have expressed conflicting views.

A study was planned to evaluate the pattern of planter reflex in newborns in relation to weight, gestational age and sex. The response by solar scratch in comparison to other methods was also studied.

Material and Methods

Five hundred newborns delivered in the State Zenana Hospital, Jaipur, were

examined within 1-3 days of delivery. Children suffering from any illness viz. asphyxia, neonatal septicemia, central nervous system disturbances, hypoglycemia etc. were excluded. At the time of examination the newborns were awake, supine, with head in midline and the leg extended at the knee by the examiner. The foot was held perpendicular to the leg. Planter response was elicited by the following methods:

(a) Solar Scratch—Firm pressure was applied with the thumb nail starting from the heel and gradually moving forwards upto the fifth toe.

(b) Oppenheim's method—The anterior surface of tibia was firmly pressed with thumb from above downwards upto the ankle.

(c) Gordon's method—The gastrocnemius muscle was squeezed gently.

The movement of the big toe was recorded simultaneously by two workers. Dorsiflexion of big toe with or without fanning of the other toes was taken as

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extensor response while planter flexion of the big toe was considered as planter response. No definite movement was recorded as equivocal.

Observations

An extensor response was recorded in 78.4 per cent newborns by the solar scratch method. 16.4 per cent showed flexor and 5.2 per cent an equivocal response by this method. The response was flexor in 83 per cent and 80.6 per cent newborns by the Oppenheim's and Gordon's method respectively. It was extensor in 16 per cent and 18.2 per cent newborns and equivocal in 1 per cent and 1.2 per cent respectively by the two methods (Table I). There was no significant difference

It was observed that by solar scratch method the planter response becomes extensor in greater percentage of newborns with the increase in birth weight and gestational age. No such correlation was observed in response elicited by Oppenheim's and Gordon's method.

Discussion

The present study demonstrates that vast majority of the newborns have bilateral extensor response by solar scratch method. Similar reports have been given by Babinski (1896), Waggoner and Ferguson (1930), Dietrich and Hills (1957), Brain and Wilkinson (1959), Dalgit (1978) and Miglani et al (1979). While a flexor response has been observed by

TABLE I
Planter Response—an Overall View

Method	Extetnsor	Flexor	Equivocal
Solar Scratch	78.4%	16.4%	5.2%
Oppenheim's	16%	83%	1%
Gordon's	18.2%	80.6%	1.2%

rence in the responses shown by male and female newborns.

Newborns having normal birth weight showed an extensor response in 78.6 per cent by solar scratch method and a flexor response in 85.8 per cent and 83.6 per cent cases by Oppenheim's and Gordon's method. On the other hand, low birth weight newborns (< 2 kg) had an extensor response in 76.2 per cent by solar scratch and a flexor response in 26.2 per cent by Oppenheim's and 23.8 per cent by Gordon's method (Table II). The response according to weight and gestational age has been shown in Tables II and III.

Finizio (1900), Feldman (1922), Sherman (1925), Hogan and Milligan (1971) and Illingworth (1975). With the increase in birth weight and gestational age the response becomes extensor in greater percentage of newborns. This finding is consistent with that reported by Miglani et al (1979). An extensor response in infancy as opposed to flexion response in normal adults has been attributed to the absence of myelination of pyramidal tracts during infancy (Brain, 1959).

The state of alertness, position of the foot at the onset of stimulation, position of the infant are important factors which

TABLE II
Planter Response in Relation to Weight of the Newborn

Weight in Kgs	Total No. of cases	Solar Scratch			Oppenheim's			Gordon's		
		E %	F %	X %	E %	F %	X %	E %	F %	X %
< 1	1	100			100			100		
1.0-1.5	6	73.0	10.3	16.6	16.6	83.3		3.0	80.3	16.6
1.6-2.0	35	74.3	25.7		14.3	80.0	5.7	11.4	77.1	11.4
2.1-2.5	120	75.8	17.5	6.6	16.6	73.3	10.0	20.0	68.3	11.6
2.6-3.0	244	82.4	11.5	6.1	13.7	84.7	1.6	13.7	83.0	3.3
3.1-3.5	87	80.1	17.6	2.3	18.4	78.2	3.4	14.9	79.4	5.7
3.6-4.0	6	100			16.6	83.3		16.6	66.6	16.6
> 4	1	100				100			100	
	500									

TABLE III
Planter Response in Relation to Gestational Age

Gestational Age in weeks	Total No. of cases	Solar Scratch			Oppenheim's			Gordon's		
		E %	F %	X %	E %	F %	X %	E %	F %	X %
< 28	1	100			100			100		
28-30	5	100			20	80		20	60	20
30-32	37	72.9	27.0		8.1	91.9		16.2	72.9	10.8
32-34	61	88.5	5.9	6.5	1.6	96.7	1.6	3.3	90.2	6.5
34-36	74	91.8	8.2		16.2	83.8		12.2	85.1	2.7
36-38	89	92.8	7.2		16.8	80.9	2.2	6.7	93.2	
38-40	233	97.7	12.3		9.0	91.0		8.15	91.0	.85

may affect the response (Hogan and Milligan, 1971). The pressure exerted during applying the stimulus may also alter the response so that a light touch results in a withdrawal response while firm pressure in extensor response (Waggoner and Ferganson, 1930). Parmelee (1899) stated that care should be taken during eliciting the response as not to touch the ball of the foot since that invariably causes planter grasp.

It has been reported by various workers (Sherrington, 1910; Walshe, 1914; Riddoch, 1917; and Brain and Wilkinson, 1959) that planter reflex can be elicited by stimulating large areas of limb and abdominal surface and deep structures as well, though the stimuli required for such elicitation has to be stronger. Riddoch (1917) mentioned that these areas on stimulation produce flexion of hip, knee and feet but the toes are little affected if at all, while sole stimulation produces dorsiflexion of the toes. Such stimulation from other areas i.e. using Oppenheim's and Gordon's method has shown that the response is flexor in majority of the cases which confirms the findings of Miglani *et al* (1979) but is contrary to the observations of Daljit (1978) who reports a predominantly equivocal response. Using these methods there was no definite correlation with the increasing birth weight and gestational age. There has been no significant difference between the responses elicited by male and female newborns as shown by other workers (Miglani *et al*, 1979).

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