

## **Follow-up of High Risk Neonates**

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## **Abstract**

The improvement in perinatal care has led to increase in survival as well as morbidity in sick newborns. These babies need to be followed up regularly to assess growth and neurodevelopmental outcome and for early stimulation and rehabilitation. We present a protocol describing the various components of a follow up program including setting up of follow up services, procedures and timings of follow up.

*Key words: Follow up; neurodevelopmental outcome; early stimulation*

## Introduction

Improving perinatal and neonatal care has led to increased survival of infants who are at-risk for long-term morbidities such as developmental delay and visual/hearing problems<sup>1,2</sup> Moreover, many of these neonates (e.g. extremely low birth weight infants) tend to have higher incidence of growth failure and ongoing medical illnesses. A proper and appropriate follow-up program would help in early detection of these problems thus paving way for early intervention.

### Importance of follow-up care

Numerous studies have shown that despite substantial improvements in the neonatal mortality, the incidence of chronic morbidities and adverse outcomes among survivors has not declined much.<sup>3</sup> This highlights the need for a follow-up care service that would ensure systematic monitoring of the general health and neurodevelopmental outcomes after discharge from the hospital. The monitoring would help the infants and their families (early identification of problems and hence early rehabilitation services) as well as the physicians involved in their care (to improve the quality of care provided and for research purposes). There is a common perception that high risk follow-up mainly concerns with detection and management of neurosensory disability. Infact growth failure and ongoing illnesses are equally , if not more important issues in high risk follow-up. Adequate emphasis must be placed on these .

However, a rigorous follow-up of all the neonates discharged from a particular health facility would neither be practical nor feasible. Therefore, it is important to select a cohort of neonates who are at a higher risk of developing these adverse outcomes – ‘*at-risk*’ *infants*. Surprisingly, there are no standardized guidelines for follow up of high risk infants even in tertiary care centers<sup>4</sup>. We have devised a follow up protocol which identifies the subset of neonates to be followed up and outlines the optimal time for follow-up visits and the appropriate assessment measures to be adopted .

### Setting up of follow up services

High risk infants' follow-up requires a multidisciplinary approach involving a team of pediatricians, child psychologist, pediatric neurologist, ophthalmologist, otorhinolaryngologist, physiotherapist, occupational therapist, medical social worker, and a dietician. The respective role of each team member is summarized in Table 1.

**Table 1: Personnel required for follow-up program and their individual roles**

S. No	Team member	Role(s)
1.	Pediatricians / neonatologists	<ul style="list-style-type: none"> <li>Serves as the nodal person of the team</li> <li>To assess growth and screen for developmental delay</li> <li>To manage intercurrent illnesses</li> </ul>
2.	Child psychologist(s)	<ul style="list-style-type: none"> <li>For formal neurodevelopmental assessment</li> <li>Screening for behavioral problems and their management</li> </ul>
3.	Pediatric neurologist	<ul style="list-style-type: none"> <li>Long-term management of neurological illnesses such as seizures</li> </ul>
4.	Ophthalmologist	<ul style="list-style-type: none"> <li>Follow-up of ROP screening/treatment</li> <li>Assessment of visual acuity and screening for problems such as strabismus, nystagmus, refractory errors, etc.</li> </ul>
5.	Otorhinolaryngologist	<ul style="list-style-type: none"> <li>Hearing assessment (BERA, OAE, etc.)</li> <li>Management of hearing impairment, if any</li> </ul>
6.	Dietician	<ul style="list-style-type: none"> <li>Dietary advice regarding complementary feeding</li> <li>Management of infants with failure to thrive and those with special needs (e.g. galactosemia)</li> </ul>
7.	Medical social worker	<ul style="list-style-type: none"> <li>To take care of the social issues to help improve follow up rates</li> </ul>
8.	Physiotherapist	<ul style="list-style-type: none"> <li>Assessment and grading of muscle tone and power</li> <li>Plan an appropriate training program for each infant with tone abnormalities</li> <li>To teach the parents for continuing the prescribed exercises at home</li> </ul>
9.	Speech / occupational	<ul style="list-style-type: none"> <li>Rehabilitation of infants with impairment/disability</li> </ul>

	therapist	
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Ideally, all the required personnel should be available under one roof at a place earmarked for follow-up care. If this is not feasible, at least the services of pediatrician, clinical psychologist, dietician, medical social worker, and physiotherapist should be ensured in the follow-up clinic. Medical social worker is an important member of the team liasoning with the family and helps them to keep follow up visits. Infants who need hearing/visual assessment or speech therapy can be referred to the concerned specialist on fixed days.

**Who needs follow-up care?**

Selection of high-risk infants should be based on the gestational age, birth weight, occurrence and severity of perinatal/neonatal illnesses, interventions received in the neonatal intensive care unit (NICU), presence of malformations, etc. It can further be modified for each unit based on their admission and outcome profiles.

Panel 1 lists the cohort of high risk infants whom we follow-up in our unit.

**Panel 1: High risk neonates who need follow-up care (customize as per policy)**

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| D | <ol style="list-style-type: none"> <li>1. Babies with &lt;1800g birth weight and/or gestation &lt;35 weeks</li> <li>2. Small for date (&lt;3<sup>rd</sup> centile) and large for date (&gt;97<sup>th</sup> centile)</li> <li>3. Perinatal asphyxia - Apgar score 3 or less at 5 min and/or hypoxic ischemic encephalopathy</li> <li>4. Mechanical ventilation for more than 24 hours</li> <li>5. Metabolic problems – Symptomatic hypoglycemia and hypocalcemia</li> <li>6. Seizures</li> <li>7. Infections – meningitis and/or culture positive sepsis</li> <li>8. Shock requiring inotropic/vasopressor support</li> <li>9. Major morbidities such as chronic lung disease, intraventricular hemorrhage, and periventricular leucomalacia</li> <li>10. Infants born to HIV-positive mothers</li> <li>11. Twin with intrauterine death of co-twin</li> <li>12. Twin to twin transfusion</li> <li>13. Hyperbilirubinemia &gt; 20mg/dL or requirement of exchange transfusion</li> <li>14. Rh hemolytic disease of newborn</li> <li>15. Major malformations</li> <li>16. Inborn errors of metabolism / other genetic disorders</li> <li>17. Abnormal neurological examination at discharge</li> </ol> | 5 |
|---|--|---|

The developing brain of premature babies is extremely vulnerable to injury; the risk for neurodevelopmental deficit increases with decreasing gestational age and birth weight resulting in relatively high risk of cerebral palsy, developmental delay, hearing and vision impairment and subnormal academic achievement <sup>5</sup>. Similarly, small for date infants (birth weight < 3<sup>rd</sup> centile) are also at significant risk of poor long term outcomes. Those who required mechanical ventilation for more than 24hours, babies with metabolic problems – symptomatic hypoglycemia as half of them have abnormal neurodevelopmental outcome, symptomatic hypocalcemia, birth asphyxia Apgar score 3 or less at 5 min, abnormal neurological examination at discharge, seizures, hyperbilirubinemia > 20mg/dL or requirement of exchange transfusion, Rh hemolytic disease of newborn as they have anemia presenting till three to six months age, infections – culture positive sepsis or meningitis, babies born to HIV infected mothers, twin with intrauterine death of co-twin due to increased incidence of cerebral venous thromboembolic phenomenon, twin to twin transfusion or major malformation. All infants cared for in the NICU should have periodic preventive assessment by their primary care physicians which should include regular assessment of growth, sensory function, behavior and neurodevelopment. Infants with suspect findings should be referred for more comprehensive evaluation to a center with experience in follow up of high risk neonates.

### **Pre-requisites for follow-up**

To ensure proper follow-up of the high risk infants, parents (especially mother) and other family members should be counseled even before discharge from the hospital. Discharge should be planned well in advance so that the mother can be counseled adequately.

**Discharge planning:** Discharge planning should ideally begin as soon as the baby is admitted in the nursery. This gives adequate time for the caretakers to ask questions and practice skills. The following criteria should be fulfilled before discharging a high risk infant:

- Hemodynamically stable; able to maintain body temperature in open crib
- On full enteral feeds (either breast feeding or by *paladai*/spoon)
- Parents confident enough to take care of the baby at home
- Has crossed birth weight and showing a stable weight gain for at least three consecutive days; in case of very low birth weight infants, weight should be at least 1400 grams before considering for discharge.
- Not on any medications (except for vitamins and iron supplementation). Ideally preterm babies on theophylline therapy for apnea of prematurity should be off therapy for at least five days to make sure that there is no recurrence.
- Received vaccination as per schedule (based on postnatal age).

These criteria can be individualized to meet the infant and family needs.

**Counseling prior to discharge:** Counseling plays an important role in the care of these babies at home; regular counseling sessions should be done before discharge. Parents should be given advice regarding:

- Temperature regulation – proper clothing, cap, socks, Kangaroo mother care etc.
- Feeding – type and amount of milk, method of administration, and nutritional supplementation, if any.
- Prevention of infections – hand washing, avoidance of visitors, etc.
- Follow-up visits – where and when (Table I)
- Danger signs – recognition and where to report if signs are present
- Vaccination – schedule, next visit, etc.

- Special needs – e.g. next visits for ROP screening.
- If possible the family should be provided with the telephone number of the health care provider e.g. on-duty doctor in case the family needs to consult for infant's illness.

### **Procedure for follow-up**

**Venue:** A specified site should be earmarked for follow up services. The parents should be properly communicated about the venue and it should also be mentioned in the discharge summary. Registration procedure at the follow-up clinic should be simplified to avoid any undue delay. Ongoing illness is common problem among these infants. If the infant develops any illness requiring admission, priority should be given for the same.

**Record maintenance:** There should be a separate but uniform file for each high risk infant . We have separate files for male and female babies. Male babies get blue and female babies get pink files. Addresses and telephone numbers should be entered clearly in the file. If possible, an alternate address and telephone number should also be recorded. It may be good idea to enquire an important landmark for locating the house in case one needs to make a home visit. The family should also be given a booklet containing follow-up information.

**Schedule:** The follow up schedule should be explained to the parents (*see below*). Timings should be fixed and adhoc visits should be discouraged.

**Corrected age:** Age of the child since the expected date of delivery. The correction for gestational immaturity at birth should be done till 24 months age. All developmental milestones are assessed according to corrected age to compensate for the prematurity. The addition of complementary feeds is also according to corrected age.

**Postnatal age:** Age of the child since birth. Immunization is done according to postnatal age.

### **When to follow up**

For the purpose of follow-up visits, at-risk infants can be grouped under two major categories: (1) preterm/LBW infants and (2) infants with other conditions. The follow-up

schedule for both these categories has been summarized in Table II. This schedule represents minimum number of visits of high risk neonates. If the baby has ongoing issues or illness, more frequent visits are recommended. Please note that first contact of the infant with the health providers after discharge is important and helps in identification of adjustment problems at home. Ideally this contact should be achieved by the home visit.

**Table II: Follow-up schedule of at-risk infants**

<b>Cohort</b>	<b>Schedule for follow-up</b>
1. Infants with <1800g birth weight and/or gestation <35 weeks	<ul style="list-style-type: none"> <li>• After 3-7 days of discharge to check if the baby has been adjusted well in the home environment. Every 2 weeks until a weight of 3 kg (immunization schedule until 10-14 weeks to be covered in these visits)</li> <li>• At 3, 6, 9, 12 and 18months of <i>corrected</i> age and then every 6 months until age of 8years</li> </ul>
2. All other conditions	<ul style="list-style-type: none"> <li>• 2 weeks after discharge</li> <li>• At 6, 10, 14 weeks of postnatal age</li> <li>• At 3, 6, 9, 12 and 18months of <i>corrected</i> age and then every 6 months until age of 8years</li> </ul>

**Note: If a preterm infant (< 35 weeks) develop any other morbidity covered in 'other conditions', he should be followed up as per the schedule outlined for the first group of cohort**

The selection of age of assessment depends on developmental acquisitions available at a given age, availability and applicability of appropriate test instruments at specific ages and the cost and feasibility of long-term tracking in the population in question. The long term follow up of complete cohorts is optimal for determining the outcome of high risk neonates and the safety of antenatal and perinatal interventions. Very low birth weight babies or those born at less than 33 weeks gestation should be followed up for eye check up for retinopathy of prematurity till the postnatal age of 44 weeks.

Some neurological abnormalities that are identified in the first year of life are transient or improve whereas findings in other children may worsen over time.<sup>7</sup> By 12 months corrected age the cognitive and language assessment can be done. By 18-24 months corrected age there is improved prediction to early school age performance.<sup>8, 9, 10</sup> The importance of long term follow up lies in the fact that minor neurological disabilities may not be detected early and become apparent only with increasing age. Standard follow-up for many multicenter networks is currently at 18-24 months corrected age.

**What should be done at follow up?**

Table III summarizes the plan for follow up.

**Table III: Follow up plan for high risk infants**

<i>Assessment</i>	<i>Age in months</i>
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Assessment of feeding and dietary counseling	1	2	3	6	9	12	15	18	24	.....8years
Growth monitoring	All visits									
Immunization	As per schedule (based on postnatal age)									
Neurological examination			*	*	*		*	*	*	*
Developmental assessment and DQ			*	*	¶	*	¶	¶	*	
Hearing (BERA)		*	¶	¶	¶	¶	¶	¶	¶	
Ophthalmic evaluation				*	¶	¶	¶	¶	¶	
USG/CT brain	As indicated									
	¶ if previous test abnormal									

1. **Assessment of feeding and dietary counseling:** Parents should be asked about the infants' diet and offered dietary counseling at each visit. Breast feeding frequency and adequacy should be assessed. The amount, dilution and mode of feeding should be noted if supplemental feeding is given. It is a good idea to enquire about source of milk as milk supplied by local vendors is often diluted (dilution has the same impact on the infant whether done by the family or the vendor!). It is also important to record the duration of exclusive breast feeding. If a baby is not gaining adequate weight on exclusive breast feeding take care of any illness, maternal problems which may interfere with feeding and milk output. If poor weight gain persists despite all measures to improve breast milk output, supplementation can be considered.

Complementary feeding should be started at 6 months corrected age. Initially, semisolids should be advised in accordance with the local cultural practices . Spend adequate time on explaining what to give and how to give. The common practice of giving too little or too dilute complementary food such as rice-water, dal-water, too much of juice, etc should be discouraged. The recommended meal frequencies – assuming a diet with energy density of 0.8 kcal per gram or above and low breast milk intake are: 2–3 meals per day for infants aged 6–8 months; 3–4 meals per day for infants aged 9–11 months and children 12–24 months; additional nutritious snacks may be offered 1–2 times a day, as desired. Complementary foods should be varied and include adequate quantities of meat, poultry, fish or eggs, as well as vitamin A-rich fruits and vegetables every day. Where this is not possible, the use of fortified complementary foods and vitamin mineral supplements may be necessary to ensure adequacy of particular nutrient intakes. As infants grow, the consistency of complementary foods should change from semisolid to solid foods and the variety of foods offered should increase. By eight months, infants can eat 'finger foods' and by

12 months, most children can eat the same types of food as the rest of the family. The major problem with the family food is that it is not nutrient-rich<sup>11</sup>.

2. **Growth monitoring:** Growth (including weight, head circumference, mid-arm circumference and length) should be monitored and plotted on an appropriate growth chart at each visit. We use Wright's charts (till 40 weeks PMA) and WHO growth charts (for preterm infants after 40 weeks PMA and for term infants) for growth monitoring . The infant's growth pattern (slope of the curve) is compared with the standard curve; any deviation should be noted and appropriate remedial action taken. Weight should be taken on an electronic weighing scale. Length should be measured with an infantometer. The infant should be held supine and legs fully extended. The feet should be pressed against the movable foot piece with the ankles fixed to 90°. Head circumference should be measured with nonstretchable fiberglass tape.<sup>12</sup>
3. **Developmental assessment:** Assessment of developmental milestones should be done according to the corrected age. The milestones should be assessed in four domains- gross motor, fine motor, language, and personal-social (*see page 10 with instructions for filling given in page 9 of HRC file*). The date of assessment and the infants' corrected age should be mentioned against each milestone. Based on the date of achievement of milestones in a particular domain and the expected age of achieving them, the developmental age can be calculated.

Infants who lag behind in any domain should undergo a formal developmental evaluation by a clinical psychologist using tests such as Developmental assessment of Indian Infant II (DASII II)<sup>13</sup>. This scale consists of 67 items for assessment of motor development and 163 items for assessment of mental development. Motor scale assesses control of gross and fine motor muscle groups. Mental scale assesses cognitive, personal and social skills development. Both mental development index and psychomotor development index can be calculated by DASII. The age placement of the item at the total score rank of the scale is noted as the child developmental age. This converts the child total scores to his motor age (MoA) and

mental age(MeA). The respective ages are used to calculate his motor and mental development quotients respectively by comparing them with his chronological age and multiplying it by 100. ( $DMoQ = MoA/CA \times 100$  and  $DMeQ = MeA/CA \times 100$ ). The composite DQ is derived as an average of DMoQ and DMeQ.

The Vineland Social Maturity Scale measures social competence, self-help skills, and adaptive behavior from infancy to adulthood. The Vineland scale consists of a 117-item interview with a parent or other primary caregiver.

It is emphasized here that developmental stimulation of the child should not be delayed if the above mentioned tests are not available. Age appropriate stimulation should be provided to these babies. Mental development index and Psychomotor development index at 3, 12,18 and 24 months and every 3 months if abnormal.

4. **Immunization:** Immunization should be ensured according to chronological age . Parents should be offered the option of using additional vaccines such as Hemophilus influenzae B, typhoid and MMR.
5. **Ongoing problems:** They should be mentioned in the follow up notes . The management of ongoing illnesses is an integral part of any high risk follow up program. The hospital admission of the child should be prioritized, if required.
6. **Neurological assessment:** Evaluation of muscle tone is an integral part of the neurological examination. A waxing and waning pattern of neuromotor development from 28 weeks of gestation to the end of first year of life was reported by Amiel-Tison. From 28 to 40 weeks gestation, the acquisition of muscle tone and motor function spreads from lower extremities towards the head. After full term, the process is reversed so that relaxation and the motor control proceed downwards for the next 12 to 18 months. So the upper limbs begin to relax and acquire skills before the lower limbs. The axial tone follows a similar pattern. Head control appears first followed by the ability to sit, stand and walk. Hypertonia or hypotonia should be looked for by measuring the following angles: adductor angle, popliteal angle, ankle dorsiflexion, and scarf sign; any

asymmetry between the extremities should also be recorded. Any history of seizures or involuntary movements should also be recorded.

Hypertonia in lower limbs is defined as when either adductor angle is restricted to less than the age specific norms as per Amiel-Tison or if there is scissoring or tight tendo-achilles or restriction of ankle dorsiflexion on extension of knee. Hypertonia in upper limbs is defined as when scarf sign does not cross midline at one year corrected age. Hypertonia of the neck extensors can be inferred by an increased gap between the nape of the neck and examination table with the infant lying in supine position.

The following angles should be measured to assess tone as shown in Figure1, Table IV:

**Table IV: Muscle Tone Norms**

<b>Age (months)</b>	<b>Adductor angle</b>	<b>Popliteal angle</b>	<b>Dorsiflexion angle</b>	<b>Scarf sign</b>
<b>0-3</b>	40° -80°	80° -100°	60° -70°	Elbow does not cross midline
<b>4-6</b>	70° -110°	90° -120°	60° -70°	Elbow crosses midline
<b>7-9</b>	110° -140°	110° -160°	60° -70°	Elbow goes beyond axillary line
<b>10-12</b>	140° -160°	150° -170°	60° -70°	

Truncal extensor hypertonia: there is a tendency of body to go into hyperextension or opisthotonus.

Cerebral palsy: Definitely abnormal neurological examination with upper motor neuron signs with motor developmental delay.

**Spastic hypertonia syndromes:**

Hemiplegia- only one half of body involved

Diplegia- paresis of lower limbs more than upper limbs

Quadriplegia- Paresis of all four limbs with upper limb involvement equal to or more than lower limbs.

Abnormal neurological examination should be defined as definite abnormalities In the form of:

- a) Brisk reflexes with hypertonia or
- b) Brisk reflexes with hypotonia or
- c) Definitely and consistently elicited asymmetrical signs or
- d) Persistent abnormal posturing or abnormal movements

The tone abnormalities should be taken care by regular physiotherapy. This improves mobility of joints and locomotion of the child. The child should be provided with special shoes if required. Orthopedic evaluation should be done and corrective surgery for contractures should be done as required. All possible efforts should be made to improve mobility of these children and make them functionally less dependent and independent if possible.

**Eye evaluation:** The check-up for retinopathy of prematurity starts in the NICU and continues till 44 weeks postconceptional age or till the retinal vessels have matured. Refer to protocol on Retinopathy of prematurity<sup>14</sup> .

At 9 months corrected age the ophthalmologist should evaluate the baby for vision, squint, cataract and optic atrophy. Subjective visual assessment can be made from clinical clues as inability to fixate eyes, roving eye movements and nystagmus. Objective visual assessment should be done with the Teller Acuity Card. It has seventeen 25.5 × 51 cm cards. Fifteen of these contain 12.5 × 12.5 cm patches of square-wave gratings( vertical black and white strips) ranging in spatial frequency from 38.0 cycles/cm to 0.32 cycles/cm. The range is in half octave steps. A cycle consists of one black and one white stripe and an octave is a halving or doubling of spatial frequency. In Snellens terms it is an halving or doubling of the denominator e.g. 6/6, 6/12, 6/24. Half octave steps would be 6/6, 6/9, 6/12, 6/18, 6/24 and so on.

There is a low vision card containing 25.5 × 23 cm patch of 0.23 cm cycle/cm ( 2.2 cm wide black or white stripes). The seventeenth card is a blank grey card with no grating pattern. The gratings have 82 – 84% contrast and are matched to the surrounding grey card to within 1% in space average luminance. This minimizes the chance of a patient fixating because of brightness difference. Detection of pattern alone determines the fixating preference. Proper illumination without any shadows should be ensured (10 candelas /sqm). Testing distance from patient's eyes to the cards should be maintained constant as it determines the visual acuity. Children from 7m to 3y should be tested at 55 cm and later at 84 cm.

Rehabilitation for visual impairment should be early so that the child gets appropriate stimulation. If delayed the restoration of the vision may not be possible because of continuous sensory deprivation of the optic nerve. The child should be provided with glasses or corrective surgery as appropriate. It should be emphasized that a good high risk follow up program does not only pick up handicaps early but also ensures early corrective measures and rehabilitation. This emphasizes the multidisciplinary and well coordinated approach to such babies

7. **Hearing evaluation:** High risk infants have higher incidence of moderate to profound hearing loss (2.5-5% vs. 1%). Since clinical screening is often unreliable, brainstem auditory evoked responses (BAER/BERA) should be performed between 40 weeks PMA and 3 months postnatal age. A screening BERA is usually done initially. If this is abnormal, a diagnostic BERA should be done within 2 weeks of the initial test. Infants with unilateral abnormal results should have follow-up testing within three months. The test should be carried out in a sound-proof room and the infant should be sedated with oral triclofos 50mg/kg 30 min before the procedure. To measure the electrical pulses, small monitoring electrodes are placed on the scalp. Earphones provide a clicking noise to the ear and the response from the brainstem is measured time-locked to the clicks. The clicks may become louder or softer, faster or slower, to see how the auditory responds to these different stimulus parameters. The other method of assessment for hearing is oto-acoustic emission (OAE). This records acoustic feedback from the cochlea through the ossicles to the tympanic membrane and ear canal following a click stimulus. It is quicker to perform than BERA but is more likely to be affected by debris or fluid in the external and middle ear. It is

unable to detect some form of sensorineural hearing loss including auditory dyssynchrony.

The severity of hearing loss is profound (70 dB or more of hearing loss), severe (50 dB - 70 dB), moderate (30 dB - 50 dB) and mild (15 dB - 30 dB).

The audiological testing should be done at 3 months of age. Infants with true hearing loss should be referred for early intervention to enhance the child's acquisition of developmentally appropriate language skills. The child should be provided with hearing aids and if severe to profound hearing loss cochlear implants should be considered by 12 months age. Fitting of hearing aids by the age of 6 months has been associated with improved speech outcome. Initiation of early intervention services before three months age has been associated with improved cognitive development at 3years age<sup>15</sup>

### **Early stimulation**

The high risk baby requires more attention of the family members. Parents and family members need to aid the development process in an age appropriate way spending quality time with children. Such interactions improve parent child relationship and bring about positive parental attitudinal change. Effective parents supervise their children in an age appropriate way, use consistent positive discipline, communicate clearly and supportively, and show warmth, affection, encouragement, and approval. The actions of the child should be appreciated. This makes him happy and encourages doing more activities.

### **0-2 months:**

#### *Activities*

- Maintain eye to eye contact
- Talk and sing to the baby while bathing, dressing and feeding
- Help the baby to turn his head to sound and light

#### *Auditory*

- Provide different sounds to the child like rattle, bell, squeezing a toy. Make the child listen to music, high pitched and low pitched human sounds
- Humming in a soft low voice

*Visual*

- Keep the baby in a well lighted room
- Shine mobile, color balls and hang bright clothes

*Tactile*

- Put the baby on different surfaces like soft clothes, mattresses, rubber mat and mother's lap
- Change the child's position frequently like putting on his back, sides and tummy

*Kinesthetic*

- Support the head and gently rock the child avoiding sudden jerky movements

**2-4 months**

*General stimulation*

- Hold the baby at the shoulder
- Place things just out of the reach of the baby. Stimulate him to reach out and grasp the object

*Auditory*

- Give sound producing toys
- Talk to the child more frequently
- Point out the names of objects shown to the child

*Visual*

- Hang bright objects about 30cm above the crib
- Maintain eye contact while talking to the child

*Tactile*

- Give the child paper to crumble and things to bite and suck
- Place the child on a rubber mat on the ground allowing him to move freely

**4-6 months:**

*General activities:*

- Sit the baby in the mother's lap and ask her to gently bounce her knees singing songs.
- Place the child flat on the back on the ground over a soft surface. Show him a colorful toy. Slowly turn him by flexing the far away leg. Assist him to turn over the tummy.
- Show an attractive toy and encourage the child to reach out to it.
- Put your hands under the child's feet and move his legs up and down like pedaling a cycle.

*Auditory*

- Shake a bell or a squeaky toy over the head of the baby. Encourage him to turn his head and locate the sound

**6-8 months:**

- Call the child by his name
- Make the child sit as long as possible. Give support to his pelvis.
- Give him pieces of paper to tear
- Encourage him to roll over his tummy by showing him colorful toys on one side.

**8-10 months:**

- Make the child stand by holding onto the furniture
- Encourage the child to clap hands
- Give him a small container and ask to drop small thing into it.
- Encourage him to produce monosyllables.
- Show him picture books and assist to turn the pages.

**10-12 months:**

- Let the child play with other children
- Name the body parts while bathing him
- Take the child on a walk and show him different animals and birds

- Do simple actions like clapping, bye-bye and encourage copying these actions.
- Encourage him to pull to stand by holding the furniture
- Make the child sit in front of a mirror so that he can see himself

**12-15 months:**

- Give picture books to the child. Talk about what you see and let him turn the pages
- Ask him to put cubes one over the other
- Ask him to put things into the container and then take out things out of the container.
- Hide a small toy under a cloth. Encourage the baby to find the hidden toy.
- Ask the child to scribble by drawing a few lines. First demonstrate what he is supposed to do.

**How to ensure a good follow up rate**

The importance of follow up should be emphasized frequently to the parents. The permanent and present addresses along with phone numbers should be kept to ensure follow up. If the parents do not turn up for follow up they should be telephoned and letters should be posted to ensure good follow up rates. There should be a dedicated person who can adjust the timing with the parents. If possible home visits should be arranged for those who do not turn up. There should be a comprehensive assessment of the child under one roof to minimize the hassles of roaming from one corner of the hospital to the other.

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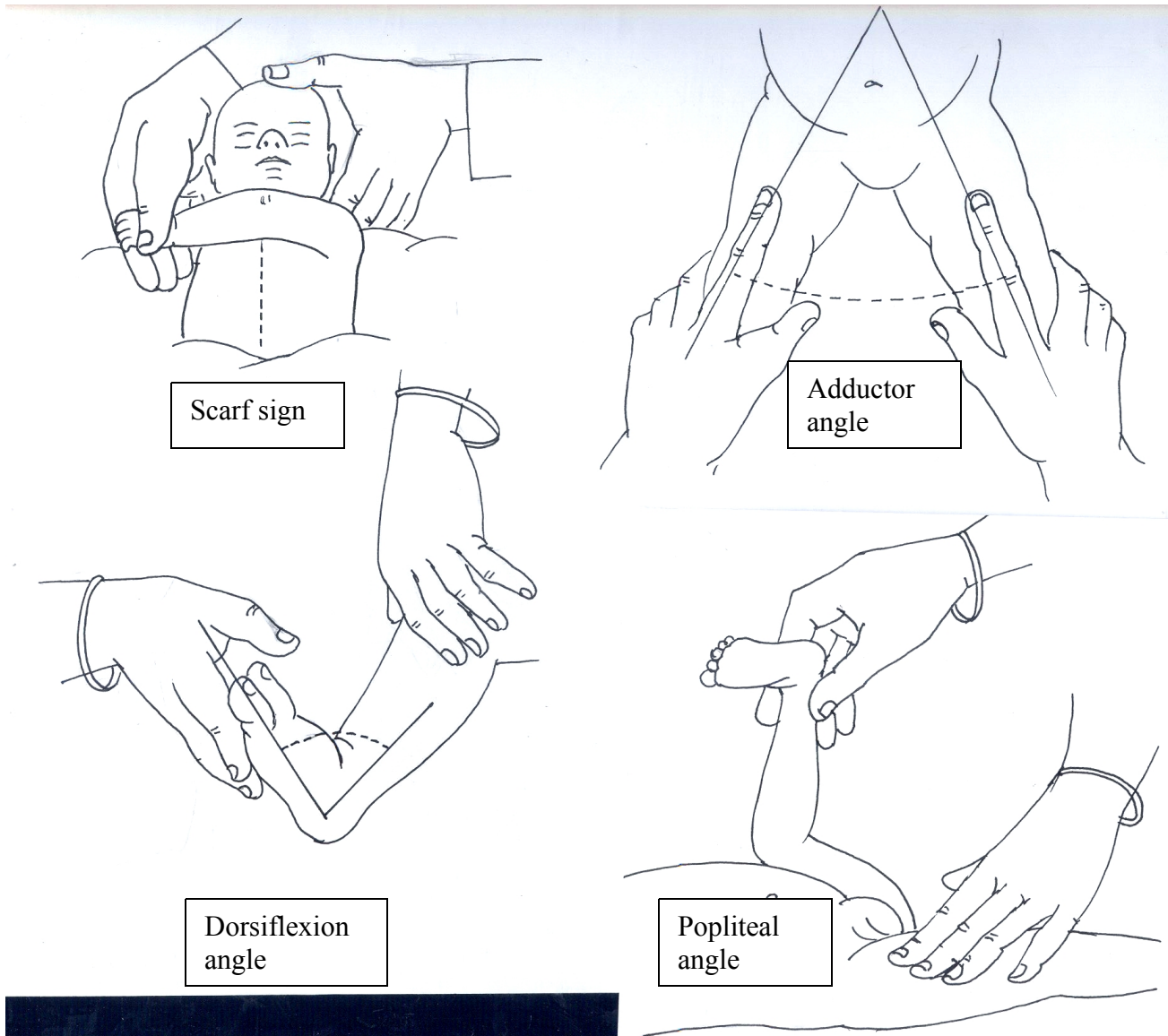


Figure1:Amiel-Tison method of assessment of tone in infants