Randomized, controlled trial of division of tongue-tie in infants with feeding problems

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Objective: To determine whether, in infants with a tongue-tie and a feeding problem, the current medical treatment (referral to a lactation consultant) or immediate division works best and enables the infants to feed normally.

Methods: Between March and July 2002, all the babies in the district of Southampton with tongue-ties were followed in order to see if they had any feeding problems. If they developed problems, the mothers gave written consent and were enrolled in an ethics committee approved, randomized, controlled trial, comparing 48 h of intensive lactation consultant support (control) with immediate division.

Results: A total of 201 babies had tongue-tie, of whom 88 had breast-feeding or bottle-feeding problems. Thirty-one were not enrolled, so 57 were randomized. Of the 29 controls, one improved (3%) and breast-fed for 8 months, but 28 did not. At 48 h, these 28 were offered division, which all accepted, and 27 improved (96%) and fed normally. Of the 28 babies who had immediate division, 27 improved and fed normally but one remained on a nipple shield ($P < 0.001$). Twenty-four mothers breast-fed for 4 months (24/40, 60%). Overall, division of the tongue-tie babies resulted in improved feeding in 54/57 (95%) babies.

Conclusions: This randomized, controlled trial has clearly shown that tongue-ties can affect feeding and that division is safe, successful and improved feeding for mother and baby significantly better than the intensive skilled support of a lactation consultant.

Key words: ankyloglossia; bottle-feeding; breast-feeding; lactation consultant; tongue-tie.

Before the 1950s, tongue-ties were divided routinely.1–4 Recent textbooks and most British paediatricians state that tongue-ties do not affect infant feeding or speech. Their advice is to see a lactation consultant or infant feeding specialist, or simply abandon breast-feeding in favour of artificial feeding.5–12 However, the recent major trend to encourage breast-feeding13 has produced some anecdotal papers,14–17 three larger studies18–20 and one prospective controlled study21 suggesting that tongue-ties can affect breast-feeding. The authors’ experience suggested that a subgroup of babies with tongue-ties appeared to exist who had problems with feeding. With the approval of the Local Research Ethics Committee, a randomized, controlled trial of tongue-tie division in babies with feeding problems, either breast- or bottle-feeding was undertaken.

METHODS

Between 1 March and 31 July 2002, all babies born in the Princess Anne Hospital, Southampton, and Hythe, Romsey and Lymington Birth Centres were actively inspected for a tongue-tie. The inspection took place at delivery, during the first newborn check or subsequently at the daily check. The people responsible for the postnatal checks (midwives, neonatal nurse practitioners and junior doctors) were formally taught what a tongue-tie looked and felt like, using a finger to examine the mouth. They were given an explanation of the purpose of the trial and a laminated sheet of six photographs of infants with tongue-ties (Fig. 1) and asked to inform Lactation Consultants Carolyn Westcott (CW) or Monica Hogan (MH) if a tongue-tie was found. The mothers were informed of the finding. Most mothers of babies with tongue-ties were seen before discharge by CW or MH and invited to enter the study, to which they gave written consent. A few mothers left hospital very soon after delivery and were seen within a few days. Initially, routine breast-feeding or artificial-feeding advice was given by the mother’s own midwife or health visitor in the usual way. In addition, all the mothers in the study were monitored weekly for 4 weeks to assess feeding. If feeding problems possibly due to the tongue-tie were recognized, the babies were seen by CW or MH for a thorough assessment of the feeding problem, examination of the baby and confirmation of the presence of a tongue-tie. If the mother consented, and there was a feeding problem and a tongue-tie, in an attempt to alleviate the symptoms and improve the feeding, the babies were randomized to either intensive support, advice and help from the lactation consultant (control), or immediate division of the tongue-tie (intervention).

In the breast-feeding control group, advice and help was given with positioning and attachment, and a plan of care was made with the mother. If this support and plan of care failed to produce any improvement after 48 h, division was offered to these mothers. The bottle-feeding mothers were given advice on different teats and positioning when feeding. The mothers themselves gauged any change in the original feeding problems.

The randomization group was determined by opening a sealed envelope which had been previously prepared by an assistant who was not part of the trial.

Definition

The percentage of tongue-tie was gauged by eye, ranging from 100% (i.e. to the tip) to 25%.

Division

The authors performed outpatient division of the tongue-tie in the following standard fashion.18,22 The baby was separated...
Randomized trial of tongue-tie in children

Fig. 1 Photos of tongue-ties for teaching the professionals doing neonatal examinations. Note that they are not all to the tip.

from the parents and wrapped securely in a towel. An assistant held the baby’s shoulders firmly with the palms of their hands, whilst their wrists fixed the head. Young babies (less than 2 weeks) tolerated this very well; most older babies disliked being restrained and began to fret. The tongue-tie was put on the stretch with the left index finger, while holding the lower lip clear with the left thumb. The tie was divided completely with sharp, blunt-ended, sterile scissors and the floor of the mouth compressed with a gauze square. The baby was promptly unwrapped, cuddled and immediately taken to the mother to be fed, either on the breast (or, if necessary, by another method, if the nipples were too sore) or by bottle for the artificially fed babies. No anaesthetic or analgesic was used. The mother and baby were given help and support as needed with feeding immediately after division. The baby was allowed to feed for as long as it wanted and then discharged.

Telephone follow-up occurred at 24 h, weekly for 4 weeks and after 4 months to enquire about their progress, long-term results and any complications. The mother was the only arbiter of whether breast-feeding had improved, as she was the only person who could feel the efficiency of the latch or the pain of chomping on her nipple or any improvement in the feeding and sleeping cycle. The mother also assessed any improvement in the efficiency of artificial-feeding (faster, less dribble, less wind).

Analysis
Statistical differences between the groups were identified using Fischer’s exact test for breast- and bottle-fed, separately and combined, on SPSS version 11.
RESULTS

Patients

During this 5-month period, 1866 live births were recorded. Of these, 201 (10.7%) had a tongue-tie. Four (who were problem-free) were lost to follow-up. There were 124 boys and 77 girls (M:F, 1.6:1).

Eighty-eight had problems with feeding (88/201, 44%) and of these 75 were breast-fed (11 gave up within a week) and 13 were solely artificially-fed. Thirty-one mothers were not enrolled into the randomized study (11 wanted immediate division (eight breast-fed and three artificially-fed), four breast-fed and improved over 4 weeks, three breast-fed but were initially uncontrollable and were subsequently found to have had problems and 13 had changed to artificial feeding and fed adequately).

The 57 remaining babies were entered into the study (40 breast-fed and 17 artificially-fed).

Symptoms at randomization (n = 57)

Thirty-three babies trying to breast-feed (33/40, 82%) had problems with latching. Twenty-one (52%) babies fed continuously. (These babies fed inefficiently for a short time, appeared to fall asleep from exhaustion, but were still hungry, so woke within an hour to feed inefficiently again.) Thirty-two mothers had painful damaged nipples (80%) and six had mastitis (15%). Fourteen babies (35%) were having top-up feeds by bottle.

The problems encountered by bottle-feeding babies were that they were very slow feeders (13/17, 76%), had major problems with dribbling (12/17, 71%), or appeared to have excess wind (4/17, 24%) (Table 1).

In the study group, 20 breast-fed and eight artificially fed babies were randomized to division, with 20 breast-fed and nine artificially fed babies in the controls. The mean age at randomization was 20 days (median 15 days, range 3–70); the breast-fed babies were randomized at a mean age of 18 days (median 19 days, range 3–51) and the artificially fed babies at a mean age of 24 days (median 19 days, range 5–70) (Table 1).

In the division group, 27/28 improved (96%), 85% immediately and 15% within 48 h. One breast-fed baby remained on a nipple shield and had continuous feeds. Twelve babies breast-fed for at least 4 months (12/20, 60%).

Table 1  Details of patients

<table>
<thead>
<tr>
<th></th>
<th>Divided</th>
<th>Controls</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male : female</td>
<td>1.0:1.0</td>
<td>1.3:1</td>
<td>57</td>
</tr>
<tr>
<td>Mean age</td>
<td>20 days</td>
<td>18 days</td>
<td></td>
</tr>
<tr>
<td>Median age</td>
<td>14 days</td>
<td>15 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(%)</td>
<td>(%)</td>
<td></td>
</tr>
<tr>
<td>Breast-fed</td>
<td>20</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Latching problems</td>
<td>17</td>
<td>85</td>
<td>102</td>
</tr>
<tr>
<td>Sore nipples</td>
<td>16</td>
<td>80</td>
<td>96</td>
</tr>
<tr>
<td>Continuous feeds</td>
<td>9</td>
<td>45</td>
<td>54</td>
</tr>
<tr>
<td>Top-up feeds</td>
<td>6</td>
<td>30</td>
<td>36</td>
</tr>
<tr>
<td>Bottle-fed</td>
<td>8</td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td>Slow bottle-feeds</td>
<td>5</td>
<td>62</td>
<td>67</td>
</tr>
<tr>
<td>Dribbling</td>
<td>5</td>
<td>62</td>
<td>77</td>
</tr>
<tr>
<td>Excess wind</td>
<td>2</td>
<td>25</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>49</td>
<td>77</td>
</tr>
</tbody>
</table>

Table 2  Improvement in feeding in 57 children with tongue-tie and feeding problems

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Improvement</th>
<th>No improvement</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>All babies</td>
<td>1</td>
<td>28</td>
<td>29</td>
</tr>
<tr>
<td>Division</td>
<td>27</td>
<td>1</td>
<td>28</td>
</tr>
<tr>
<td>Breast-fed</td>
<td>1</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>Division</td>
<td>19</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>Bottle-fed</td>
<td>0</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Division</td>
<td>8</td>
<td>0</td>
<td>8</td>
</tr>
</tbody>
</table>

In the control group, one out of 29 babies improved (3%) who breast-fed for 8 months. Despite 48 h of intensive input, as the feeding problem was no better, all the remaining 28 mothers requested tongue-tie division. Following this, 27/28 improved, 77% immediately and 19% within 48 h. One baby (4%) took 7 days. One baby’s breast-feeding did not improve, but bottle-feeding did. Twelve babies breast-fed for at least 4 months (12/20, 60%).

Overall, division of the tongue-tie resulted in improved feeding in 54 out of 57 babies (95%) (Table 2).

Complications

There were no problems with infection or bleeding, either primary or secondary. Most babies cried for only a few seconds until they were given a feed. Division of tongue-ties is not an operation, but a procedure, and mothers of older babies commented that it was much less traumatic than immunization.

DISCUSSION

This ethics committee approved, prospective, randomized, controlled trial of tongue-tie division in infants with tongue-ties and feeding problems has clearly shown that division improves feeding. Despite what is written in current medical textbooks,5–7 the professionals looking after breast-feeding infants have noticed problems who breast-feeding infants have noticed problems with tongue-ties.8–11 Previous studies had shown that this group seemed to exist, and that division of the tongue-tie was safe and easy, with a dramatic effect on the ability of the baby to breast-feed.12–15 Measurement of the sucking waveform in a neonate with a tongue-tie in 1973 showed abnormalities in the regularity and the pressures generated by the sucking, which were abolished by tongue-tie division.8,16–21

The basic tenet of a randomized trial is that the investigator does not know which arm of the trial is the best treatment for the patient, and they can therefore invite patients to enter the trial by saying that ‘the best treatment is unknown’. However, as Professor Lilford pointed out,25 this is not always the case, as there may be previous experimental or clinical work suggesting that one arm is more likely to be the best. In this situation, the investigator has difficulty in inviting patients to enter a trial, as there is no equipoise. Therefore, there has to be a pragmatic and ethically correct view of how long a patient is allowed to stay in the worst arm. This allows the investigator more honesty in inviting patients to enter the trial, as, after a reasonable time, it allows the patient who does not respond to one treatment, to try

In the worst arm. This allows the investigator more honesty in inviting patients to enter the trial, as, after a reasonable time, it allows the patient who does not respond to one treatment, to try
the treatment in the other arm. Thus, the control babies who were having problems feeding were given 48 h of intensive help before being offered division. Moreover, no mother wants anyone to do anything to their baby that might be even minimally painful, so the control mothers all wanted their babies to improve without division, if at all possible. These babies were already trying to feed for an average of nearly 3 weeks. The breast-fed babies were feeding very inefficiently, it was painful for the mother, and there was the real risk that they would give up breast-feeding, which would have been against all the medical evidence in its favour. Scientifically, they should have been allowed to continue to try to breast-feed until they gave up, but the authors and the ethics committee felt that this was not a reasonable option as there was a potential alternative treatment available (division), and some evidence that it might be very effective. If division was not helpful, then the baby would still have to bottle-feed (either well or badly), but if division helped, then this would be in the baby's best interests.

The improvement in breast- or bottle-feeding after division was usually immediate (81%) and often dramatic. However, if the nipple was sore or cracked, then it would still be sore following division, until it was allowed to heal by the baby breast-, not nipple-feeding and so improvement sometimes took 48 h (17%). One baby took 7 days after division to breast-feed normally, and this might not have been related to division, though all previous attempts at improving his feeding had failed.

The majority of babies with tongue-ties can feed adequately (56% in this series), so they were not divided. More artificially fed babies (70/113, 62%) than breast-fed babies (54/118, 46%) fed without problems. Many of these tongue-ties may be torn by the lower teeth when they erupt, or by spoons or toys in the mouth, so they may have no long-term problems either. However, this prediction is of no use to a mother who has a baby who cannot feed. There is no need to divide all tongue-ties at birth,19 but awareness of the relationship of tongue-ties with feeding problems will allow division in symptomatic babies to be performed without delay.

There was no relationship between tongue-tie length and feeding difficulty (Table 3). It was impossible to predict, just by looking at the tongue-tie, which ones would cause problems as some babies with 100% tongue-ties were feeding asymptomatically. Problems were also found in babies with 25% tongue-ties, especially if breast-fed. What was important was not the length of tongue-tie, but the symptoms it was causing.

This study has shown that there is a group of babies with tongue-ties who do have feeding problems (88/201, 44%). Most of these babies have mothers wanting to breast-feed. Since the 1950s, if there were problems with breast-feeding, then the response was that artificial feeding was as good, or even better, but this is no longer tenable, as there are demonstrable health risks to babies not receiving breast milk.26–29

Some professionals seeing large numbers of babies with tongue-ties have noticed that although the majority can bottle-feed well, a few have major problems creating a seal around the teat to ensure that they suck sufficiently. Some mothers try multiple teats and have to hold the bottle 'just right' to ensure that the baby feeds well. These babies have a major problem, as they do not exist in the textbooks and there is no 'fallback' position. Division of the tongue-tie allows these babies to latch efficiently, feed much faster, dribble less and suck in less air.

The limitations of this study are:

1. The total number of babies with problems was small (though statistically adequate) and could be increased by a 12-month study.
2. The authors felt it likely that some tongue-ties did cause feeding problems, and the study could be repeated by a group who felt the opposite.
3. In a repeat trial it might theoretically be beneficial to have a more objective measure of improvement as the mothers themselves gauged whether the baby was feeding better or not. However, there are no universally agreed measures of breast-feeding efficiency in this age group and considerable, documented interobserver variation.30 In addition, like measuring postoperative pain, the feeding problem is a subjective one. Despite these caveats, improvement was often obvious to the authors watching a breast-feeding baby, as the mother was no longer in pain. The baby fed efficiently, with long nutritive sucks on the breast, not the nipple, swallowed audibly, and by its body language, was relaxed and contented.31 The bottle-fed babies usually fed more efficiently (though this was not measured), dribbled less due to a better seal around the teat and did not need to have the bottle held 'just right'.

Despite the textbook statements and comments of many doctors that tongue-ties do not cause problems with feeding, doctors did not help these mothers and babies to feed, nor were they helped by intensive, skilled, professional support from the lactation consultants. However, feeding was improved by the simple, safe procedure of removing the physical problem which was preventing it – the tongue-tie.

### Table 3 Number (%) of babies with each length of tongue-tie

<table>
<thead>
<tr>
<th>Length of tongue-tie</th>
<th>All babies</th>
<th>All babies</th>
<th>No problems feeding</th>
<th>Problems feeding initially</th>
<th>Randomized</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B/F + A/F</td>
<td>B/F</td>
<td>A/F</td>
<td>B/F</td>
<td>A/F</td>
</tr>
<tr>
<td>n</td>
<td>201</td>
<td>141</td>
<td>60</td>
<td>71</td>
<td>42</td>
</tr>
<tr>
<td>25%</td>
<td>16 (8)</td>
<td>12 (9)</td>
<td>4 (7)</td>
<td>6 (8)</td>
<td>2 (5)</td>
</tr>
<tr>
<td>50%</td>
<td>73 (36)</td>
<td>46 (33)</td>
<td>27 (45)</td>
<td>23 (32)</td>
<td>25 (60)</td>
</tr>
<tr>
<td>75%</td>
<td>54 (27)</td>
<td>39 (27)</td>
<td>14 (23)</td>
<td>18 (26)</td>
<td>9 (21)</td>
</tr>
<tr>
<td>100%</td>
<td>50 (25)</td>
<td>36 (25)</td>
<td>15 (25)</td>
<td>16 (23)</td>
<td>6 (14)</td>
</tr>
<tr>
<td>Not known</td>
<td>8 (4)</td>
<td>8 (6)</td>
<td>8 (11)</td>
<td>8 (14)</td>
<td>20 (27)</td>
</tr>
</tbody>
</table>

A/F, artificially-fed; B/F, breast-fed.
RECOMMENDATION

Babies with symptomatic tongue-ties should have them divided by an accredited, suitably trained, suitably qualified lactation consultant, who can diagnose and treat the tongue-tie and then provide ongoing support to the mother and the baby.

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REFERENCES