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Underwater Observations of the Suckling and Social Behaviour of a New-born Bottlenosed Dolphin (*Tursiops truncatus*)

A. Eastcott* and T. Dickinson†

**Brighton Aquarium and Dolphinarium, Brighton, Sussex, BN2 1TB, England*
†Dept. of Neurobiology, Sussex University, Brighton, Sussex, BN1 9QG, England

Abstract

Twenty four hour observations were made of the suckling behaviour of a newly born Bottlenosed Dolphin. A pattern of suckling was seen to emerge which was defined into three distinct components. The results indicated more suckling at night and progressively less frequent suckling as the animal got older.

Breathing rates of the calf did not indicate a correlation with short suckling periods.

The lack of observed milk loss to the pool has been interpreted as a positive rather than a negative phenomenon.

Observations of the mother showed a clearly defined initial avoidance pattern of behaviour from other adults in the pool. This behaviour decreased as calf independence increased over time.

Introduction

The birth of a Bottlenose Dolphin at Brighton Aquarium provided us with a unique opportunity here to study suckling and developmental behaviour within the adult social group.

Various researchers have mentioned suckling in behavioural reports (e.g. McBride & Kritzler, 1951; Tavolga & Essapian, 1957; Amundin, 1986). Their observations have provided some insights into the patterns seen over the initial few weeks following the birth of a dolphin in captivity. It was largely our intention to look in detail at suckling and other behaviours within the environmental parameters of our dolphinarium and to document any new findings which may contribute to the further successful rearing and husbandry of these mammals.

Materials and methods

Materials

The indoor dolphin pool at Brighton Aquarium is of a hexagonal shape containing approximately 700 m^3 of natural seawater and with a surface area of 230 m^2. Excellent underwater viewing is made available by twenty 1 m^2 windows surrounding the pool.

An isolation area adjacent to the pool containing 165 m^3 of seawater with a surface area of 55 m^2 was not thought to be adequate for the birth and rearing of the calf. The birth was, therefore, to take place in the main pool housing the other dolphins.

The three adult dolphins at Brighton Aquarium are as follows:

(i) 'Silver', male, and father of the calf; estimated age twelve years; at Brighton eight years.
(ii) 'Missie' female, and mother of the calf; age sixteen years; at Brighton fourteen years.
(iii) 'Poppy', female; estimated age fourteen years; at Brighton ten years.

Methods

Immediately after the birth, the calf was later shown to be a female, all shows were cancelled and the general public were barred from both the underwater viewing area and the auditorium. Only certain responsible staff were allowed into the auditorium for essential duties such as feeding, cleaning, water quality measurements, etc. Twenty four hour watches were organized from day one of the birth. Record sheets were drawn up to include the monitoring of suckling, sightings of milk, calf faeces and various other behaviours. Pairs of staff took it in turns to carry out both day and night observations. Stop watches were made available. With limited staff and owing to the exhaustive nature of night time shifts, twenty four hour watches were maintained continuously for two weeks, the further five weeks data was for daytime observations only. Lighting was maintained to give a subdued effect at night, but equally giving clear vision to the observers.

Observations to parturition

Although blood sampling was not possible to determine pregnancy, it was quite evident that 'Missie' was pregnant well over three months prior to the birth. The abdominal region had obviously become far larger than normal and there was a general decrease both in the quality and quantity of her show behaviours; there was no indication that illness or

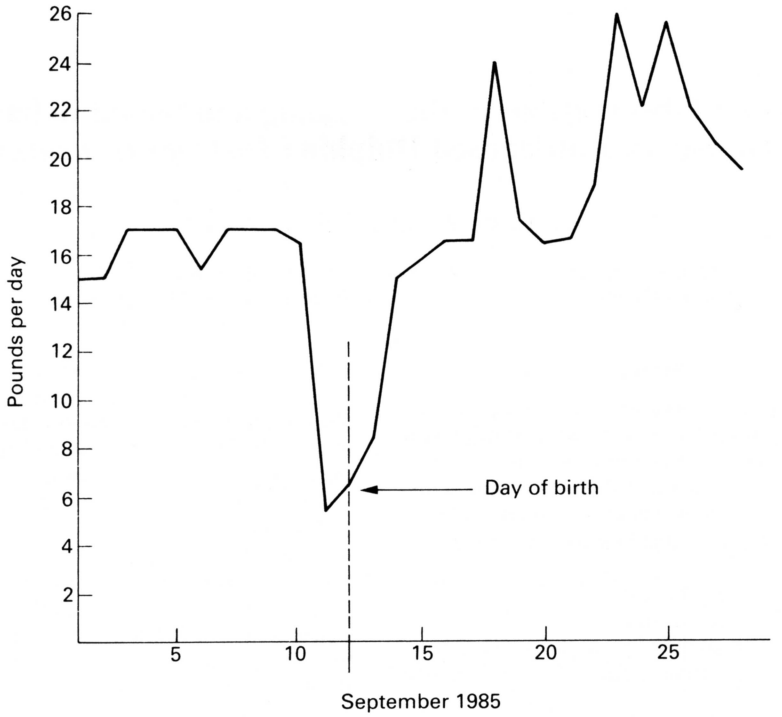

Figure 1. Food consumption of the mother 'Missie' during the month of birth.

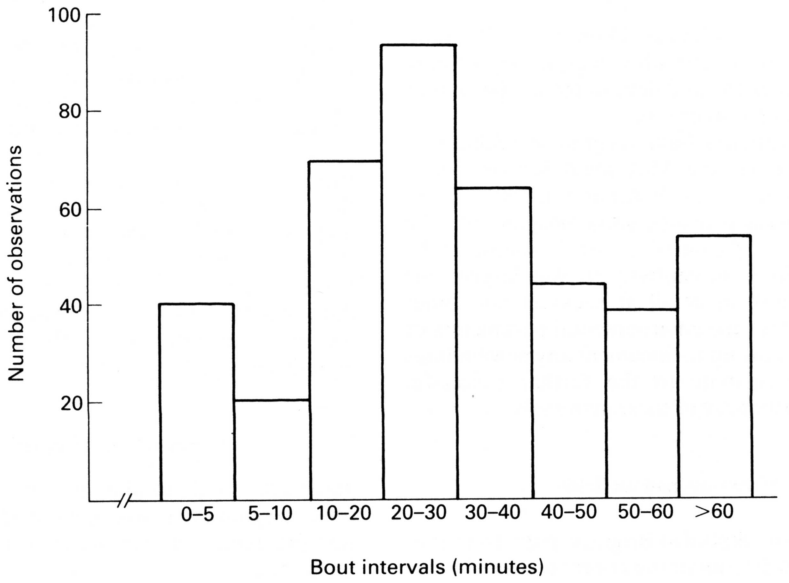

Figure 2. Pooled observations of interval times between calf suckling bouts for the first seven weeks (mean interval 32.7 mins); mean bout length 7.05 mins.

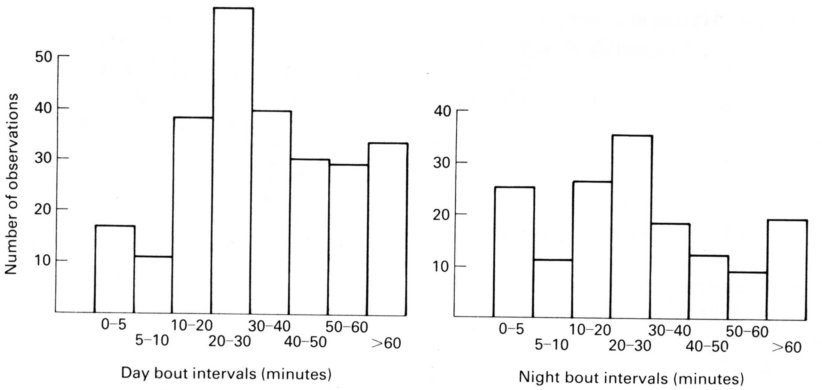

Figure 3. Comparative day and night interval times between suckling bouts (mean day interval 34.5 mins; standard deviation 24.8: mean night interval 29.6 mins; standard deviation 27.5).

other environmental factors contributed to these behavioural changes. During this period she was allowed to do as little or as much as she wished.

The first indications of imminent birth occurred during the ten day pre-parturition period, when in a stationary horizontal position on the surface, the pregnant female would intermittently flex the peduncle region in a downward movement. This has been documented by other observers (Tavolga & Essapian, 1957).

Forty hours prior to the birth there was a dramatic drop in voluntary food consumption from a daily intake of 17 lbs to $5\frac{1}{2}$ lbs, which only slightly increased to $6\frac{1}{2}$ lbs on the last feed before the birth (Fig. 1).

The actual birth was not observed, but was known to have occurred between 2200 and 0100 hours on the night of 12th September 1985. The placenta was seen to be expelled some 4–7 hours after parturition.

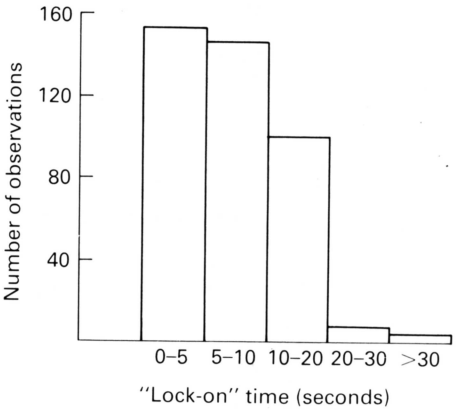

Figure 4. Pooled observations of lock-on times (suckles) for the first seven weeks (mean lock-on time 9.3 secs); mean lock-on observations per bout were 4.1.

Suckling behaviour and data

In reports of first sucklings (e.g. McBride & Kritzler, 1951; Tavolga & Essapian, 1957), exploratory nipple finding behaviour was found to be unsuccessful prior to the mother's 'rolling behaviour'; this was confirmed by our own observations. No attempted suckling was seen in the immediate hours after birth; the first attempt occurring some 17 hours after parturition and the first definite suckle some 21 hours into her life. Previous researchers (see above) have observed far shorter time lapses for both exploratory behaviour onset and suckling proper. Suckling always occurred very low in the water of our particular pool. This is contrary to other reports which have stated that cetaceans usually suckle close to the surface (e.g. Slijper, 1962).

From this time onward it became evident that suckling was not random. A pattern emerged which we defined into three components.

(i) A suckling bout.
(ii) Nipple lock-on times within each suckling bout.
(iii) An interval phase between bouts in which no suckling occurred.

Pooled data for the first seven weeks (Fig. 2) showed that suckling occurred approximately every thirty minutes. The bout length for this data averaged about seven minutes with little deviation. At first glance the bout interval compared favourably with other observations (e.g. McBride & Kritzler, 1951) but on closer examination some variation was discovered.

Figure 3 shows the same type of distribution for the data divided into day and night time recordings and indicates night time bout intervals to be shorter

than those for the day. Harrison (1968) has claimed that suckling occurs more frequently at night, but at a later stage in the calf's development.

Figure 4 shows the first seven weeks pooled data for nipple lock-on times within each bout. It can be seen that these times averaged about nine seconds, but again when day and night observations were separated differences were found; longer periods being spent at the mother's nipple during the night hours (Fig. 5).

It appeared from general observations that as the calf got older the suckling frequency decreased and so an individual analysis was made of the data from the sixth week after birth. Unfortunately this was day time data only, but it can be seen from Figs 6 and 7 that bout intervals had increased and lock-on times had decreased considerably.

It has been suggested (Harrison 1968) that the short suckle time is due to calves submerging for periods of less than one minute due to breathing constraints. However, our surface breathing records at six weeks of age when the calf's suckles had become shorter, show her capable of submerging for up to two minutes. There is not necessarily, therefore, a correlation between breathing rates and suckling times (Fig. 8)

Behavioural observations

Immediately after the birth two distinct behavioural patterns were apparent.

(i) A faster swimming speed of the mother compared to the other adults in the pool. Typically the calf would be aligned very close to the mother, usually in the region of the dorsal fin. For the first three days the mother had to be fed as she swam because no attempt was made to stop at the usual feeding platform.

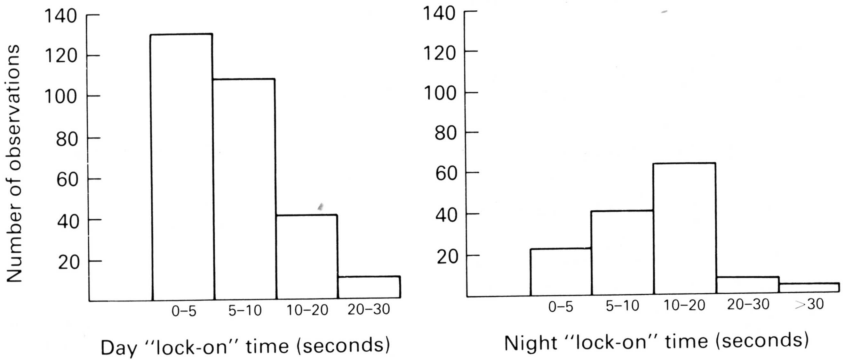

Figure 5. Comparative day and night lock-on times (day mean 8.2 secs; standard deviation 5.5: night mean 11.7 secs; standard deviation 5.6).

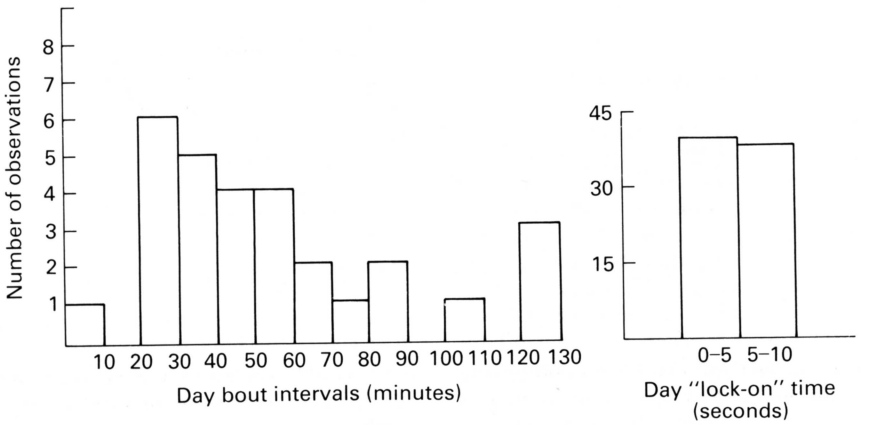

Figure 6. Observations of interval times between suckling bouts for the calf at six weeks old (mean interval 59 mins).

Figure 7. Observations of lock-on times for the calf at six weeks old (mean lock-on time 4.6 secs).

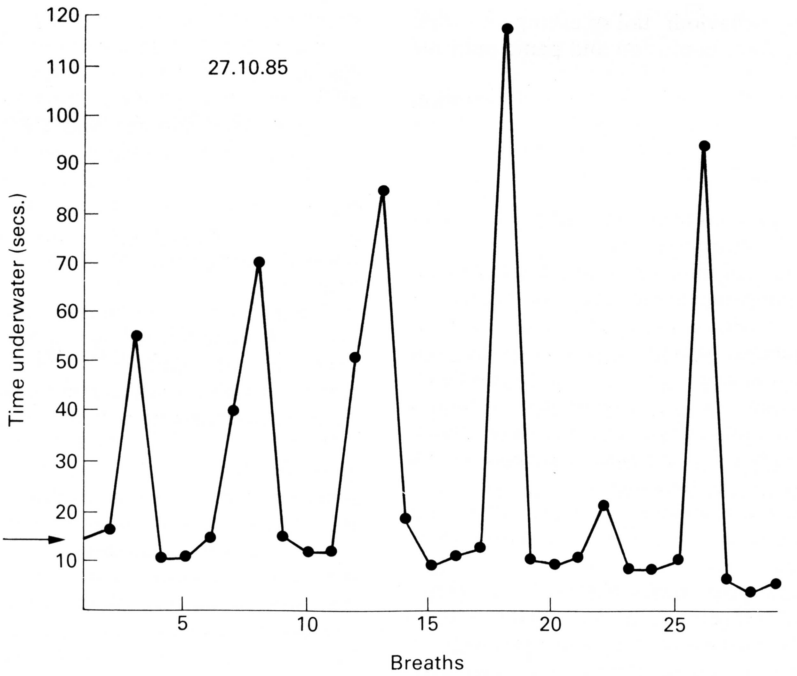

Figure 8. An example of the breathing pattern seen in the calf at six weeks old.

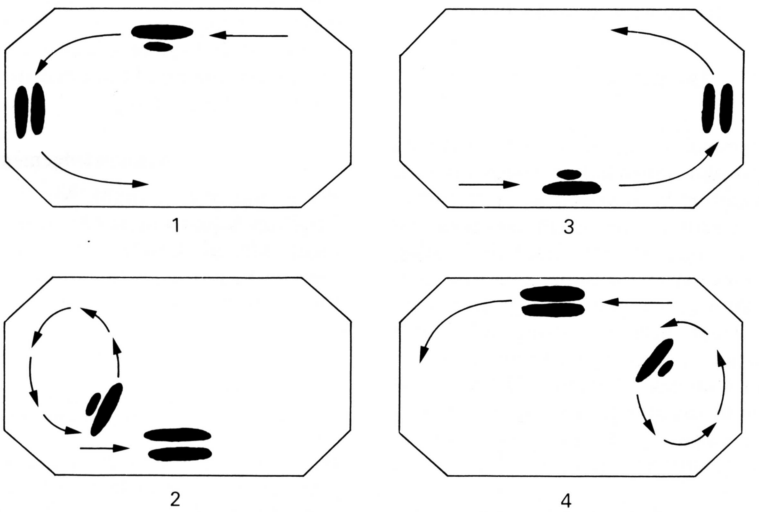

Figure 9. A representation of the avoidance behaviour taken by the mother 'Missie' immediately after the birth.

(ii) A very pronounced and regular avoidance reaction from the mother to the other adults in the pool (Fig. 9).

'Missie' would neither flank nor pass the other adults even though her swimming speed with the calf was far greater. On approaching the paired adults, she would veer away and circumnavigate one half of the pool before moving on round to repeat the pattern at the other end. This avoidance reaction continued almost unabated for the first four days and was only broken when the other two adults split up and became inquisitive. The mother was then seen to

exhibit 'darting' behaviour, tail splashing and what appeared to be some confusion and panic until the pattern was reformed.

A gradual shift towards group integration occurred over the following twenty day period and some of the more significant events, as we saw them, are tabulated below:

Day 4: Calf separated from the mother for several seconds before retrieval.
Day 5: All four dolphins (including the calf) seen swimming together for about thirty seconds before reversion to the avoidance reaction.
Day 6: Independent diving of the calf to the pool bottom without retrieval from the mother.
Day 8: Cessation of the avoidance reaction; mother and calf passing the other adults, although still maintaining comparatively higher swimming speeds.
Day 10: Independent swimming of the calf for up to ninety seconds while the mother was feeding.
Day 12: 'Auntie' phenomena observed for a brief period before intervention from the mother.
Day 20: Calf spending up to fifteen minutes with the other adult female 'Poppy' (but never with the male).
Day 23: Mother allowing suckling whilst being flanked by the other two adults (i.e. social group re-formed without disturbance).

Discussion

Suckling

As far as our research has shown, no detailed equivalent data to that above has been observed for the suckling behaviour of *T. truncatus* in the wild. Such data as it exists for captive dolphins is brief and very little has been produced in the last two decades.

Our results demonstrate without question that suckling is continuous throughout any given twenty four hour period and there are strong indications that in this particular species suckling does not follow a random sequence of events. These factors may be important in any attempt to hand rear young calves i.e. the *frequency* of feeding being just as important as the quality and quantity of any given diet.

It is of interest to note that despite many hundreds of observed suckles through crystal clear water only three sightings of ejaculatory milk were documented (although looked for). The authors themselves have watched numerous underwater detachments of the calf's mouth from the mother's nipple at extremely close quarters without the slightest sign of milk loss to the pool. Because milk 'let-down' is largely controlled by the mother (Tavolga & Essapian, 1957) it is suggested that milk loss to the pool may well result from a frightening of the calf's mouth away from the ejaculatory nipple and is not necessarily a sign that all is well. Although the authors have only observed one post-natal mother and calf pair, we might conclude that the regular presence of milk in a pool could be indicative of developmental problems resulting from stressful factors on the part of either mother or calf, so preventing the establishment of optimal feeding patterns or epimeletic (care-giving) behaviour.

The differences seen in our data between the day and night-time recordings of suckling behaviour could similarly indicate that the calf is 'optimally' feeding at a time in which minimal interruption from the general environment would occur.

Behaviour

Although unwise to generalize, the situation at Brighton Aquarium has supported the view that it is not necessary to isolate pregnant female dolphins of the species *T. truncatus* from other adults. The adult male and father has shown no protracted signs of aggression towards either the calf or mother, the latter devising her own protective pattern of avoidance in the initial days after the birth.

Our observations have shown that there is an enormous change in the calf's behaviour over the first three weeks reflecting a gradual relaxation of the mother's protective instinct. It would be reasonable to suggest that the very least interference by man, or other environmental factors is the best policy during this vunerable period.

Acknowledgements

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