

## INFLUENCE OF WEANING TIME ON BEHAVIOUR AND PERFORMANCE OF ARABIAN FOALS

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### ABSTRACT

*Ten Arabian foals aged 3-8 months, at private farm in Sharkia Province were used in this study, which continued from 1<sup>st</sup> of December 2003 till the end of June 2004. The foals were divided into two equal groups of five foals each. The animals in the first group were weaned at 3 months of age while, those in the second group were weaned normally at 5 months of age. The first group foals spent less time in eating ( $43.32 \pm 5.22$  vs  $45.52 \pm 6.22\%$  of their time), in standing rest and lying than the second group foals, but spent more time in standing alert ( $4.55 \pm 1.32$  vs  $4.12 \pm 1.53\%$  of their time).*

*The foals of first group had a lower body weight gain during the period of study than that normally weaned foals. The foals which weaned early at 3 months had engaged in stereotypies behaviour such as steps, head threat, bite threat, bite, kick threat and kick more than that foals which were weaned normally at 5 months, there was a significant difference in the level of cortisol hormone post-weaning between early weaned foals and normally weaned foals.*

*In conclusion weaning of foals at 5 months of age was less stressful, more comfort and achieve good welfare for foals than early weaning.*

### INTRODUCTION

Foals may be weaned at birth or during first few days of life for one of several reasons. The death of mother and the absence of suitable foster mare is probably the most common reason. Maternal rejection of the foals may be a reason. Some farm managers wean foals during the first week or two of life so that the mare can be transported to another farm for breeding during her foal heat without exposing the foal to the stress of a new environment. The question arises as to whether early weaning and artificial rearing may affect the foal's subsequent behaviour (*Haupt and Hintz, 1982*) Weaning time can be stressful not only for the mare and foal but for the owner's who have to listen to the heart-tearing whinnies as the baby calls for his mother.

Weaning time has been implicated as a source of stress. Foal neigh, attempt to rejoin their dam and may lose their appetite, growth rate may be slowed or the foal may injure itself (*Haupt et al., 1984*).

Mother infant separation is normally a gradual process which involve short lasting and intermittent episodes of conflict between the adult and the young until mutual independence is fully achieved, conflicts during the weaning process have been reported to affect both mother and her offspring aversively in a variety of mammals species (*Jeppesen et al., 2000*).

Compared with the transient nature of normal mother-infant separation, artificial weaning as in modern husbandry often occurs much more abruptly and at considerably earlier age of offspring and this may result in long-lasting or even permanent negative influence on the offspring (*Fraser and Broom, 1990*).

Rearing outlines of foals should fulfill the requirements necessary to provide an environment which is safe and hygienic for foals as well as is providing conditions which are acceptable to them (*Saleem, 1995*).

Generally its known that stress alter the animal behaviour, it is also evident that altered behaviour is one of principles signs of stress in foals. A foal is in a state of stress if it make abnormal or extreme changes in its behaviour to cope with adverse effects of its environment or management (*Haupt and Hintz, 1982*).

The environmental factors that initially determine the development of abnormal behaviour may be different from the factors that trigger or maintain already developed behavioural abnormalities later in life (*Mason, 1991*).

Stereotypies are behaviour pattern that are repetitive, invariant and have no obvious goal or function and is often associated with post or present sub-optimal aspects of the environment and have been used as a welfare indicator, it has been hypothesized that stereotypies have great effect on performance of animal (*Abd El-Gawad, 2002*).

This study was designed to show the influence of weaning time on behaviour and performance of Arabian foals.

## **MATERIAL AND METHODS**

This study was carried out at private farm in Sharkia province from 1<sup>st</sup> of December 2003 till the end of June 2004. Ten foals were used and classified into two equal groups (5 each) according to time of weaning. The animals in first group were obligatory weaned at 3 months of age due to mastitis of their mothers (2 cases) and insufficient milk (3 cases), each foal from this group received 4 kg berseem and 1.5 kg barely till 5 months of its age. The foals in second group were normally weaned at 5 months of age. Feeding of both groups after this time as follows, in green season, each foal received 6 kg berseem and 2 kg barely while in dry season , each foal received 2.5 kg barely and 3 kg hay after that the amount of feed was increases by progress of foal's age (*Davies Morel, 2003*).The study was continued after weaning to compare the behavioural and physiological responses of foals in two groups as follows:

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### I- Some maintenance behaviour:

Each foal was observed one hour weekly by focal animal sampling technique (*Altuman, 1974*) for recording the following parameters:

- a- **Eating time:** The time (minutes) spent in eating by foal during observation time.
- b- **Standing alert:** A foal stand with its head elevated, ears forward and eyes focused in direction of attraction.
- c- **Standing rest:** A foal was considered as to be fixed stance if it was standing still with any two of the following: one hind limb flexed, ears turned to the side and partly lowered, a lower lip flaccid, and eye partly or fully closed.
- d- **Lying:** Either sternal or lateral recumbency (*Sweeting et al., 1985*).

### II-Growth rate:

Body weight of each foal was estimated in both groups at the end of 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> months of its age, by using the following equation according to *Milner and Hewitt (1969)*.

$$\text{B.W. (Kg)} = \frac{\text{Chest girth (cm)} \times \text{Length (cm)}}{8717}$$

### III-Stereotypies behaviour:

The same method of observation was used to study the mean frequency / hours of streotypies behaviour in both groups (*Fraser, 1992*) as follows:

- 1- **Steps:** The steps taken by the right fore-limb were counted hourly.
- 2- **Head threat:** The extension of the foal's head and neck towards another foal while laying the ears against its head.
- 3- **Bite threat:** The foal's ears were laid back, its mouth was opened and a biting motion was made while it moved its head or whole body towards another foal, but no contact was made.

- 4- Bite:** The foal's ears were laid back and its teeth were close on some body part of another foal.
- 5- Kick threat:** any of the following behavioural sequences were scored as threat to kick:
- a- Foal with its ear laid back made a rapid movement. So as to place its hind quarter near another foal.
  - b- Foal with its ear laid back, raised one hind limb and held it in the air while in a position. So as to potentially strike another.
  - c- Foal with its ear laid back, rapidly struck with one or both hind limb's towards another foal but no contact.
- 6- Kick:** Foal with its ear laid back, one or both hind limbs were projected outward rapidly and struck another foal.

#### **IV- Estimation of cortisol hormone.**

##### **Blood sampling:**

Blood samples (15-20 ml) were collected three times during work by direct Jugular vein puncture using sterile hypodermic needles from foals; once one week before weaning to accustom foals to the procedures and obtain base line blood concentration of cortisol and again at two days and one week post-weaning.

Samples were collected with minimum excitement. Blood sampling began at 9 a.m. to avoid circadian variation. All samples were collected in clean sterilized marked glass test tubes. These tubes were centrifuged immediately at 3000 r.p.m. for 10 minutes and separated plasma was aspirated in sterile marked vials and stored at -20°C until assayed. The level of cortisol were detected in central laboratory at Faculty of Vet. Med., Zagazig Univ., using ELIZA technique according to *Tijssen(1985)*.

All obtained results were statistically analyzed according to *Snedecor and Cochran (1980)*.

## RESULTS AND DISCUSSION

**Table (1):** The overall mean percentage time of some maintenance behaviour in relation to weaning time.

Percentage time	Early weaned foals	Normally weaned foals
Eating	43.32±5.22 <sup>a</sup>	45.52±6.22 <sup>a</sup>
Standing alert	4.55±1.32 <sup>a</sup>	4.12±1.53 <sup>a</sup>
Standing rest	14.51±2.32 <sup>a</sup>	15.54±3.22 <sup>a</sup>
Lying	12.53±3.42 <sup>a</sup>	13.71±3.12 <sup>a</sup>

- Means with different superscripts in each row are different at level (P<0.05).

**Table (2):** Mean body weight (Kg) of foals in relation to weaning time.

Foal's age	Early weaned foals	Normally weaned foals
3 <sup>rd</sup> month	135.32±6.52 <sup>a</sup>	136.21±5.33 <sup>a</sup>
4 <sup>th</sup> month	146.41±7.22 <sup>a</sup>	161.43±6.22 <sup>b</sup>
5 <sup>th</sup> month	165.21±8.32 <sup>a</sup>	192.32±6.76 <sup>b</sup>
6 <sup>th</sup> month	191.41±7.52 <sup>a</sup>	221.51±7.81 <sup>b</sup>
7 <sup>th</sup> month	226.51±8.56 <sup>a</sup>	250.13±8.22 <sup>b</sup>
8 <sup>th</sup> month	252.62±10.22 <sup>a</sup>	272.32±11.22 <sup>b</sup>

- Means with different superscripts in each row are different at level (P<0.05).

**Table (3):** Mean frequency / hour of stereotypies behaviour in relation to weaning time.

Stereotypies behaviour	Early weaned foals	Normally weaned foals
Steps	51.52±5.31 <sup>a</sup>	42.51±4.33 <sup>b</sup>
Head threat	3.52±1.22 <sup>a</sup>	1.24±0.62 <sup>b</sup>
Bite threat	2.21±0.82 <sup>a</sup>	1.54±0.53 <sup>b</sup>
Bite	1.55±0.53 <sup>a</sup>	0.52±0.22 <sup>b</sup>
Kick threat	2.56±1.51 <sup>a</sup>	1.52±0.21 <sup>b</sup>
Kick	1.41±0.62 <sup>a</sup>	0.51±0.31 <sup>b</sup>

- Means with different superscripts in each row are different at level (P<0.05).

**Table (4):** Mean level of cortisol hormone(ng/ml)in foals in relation to weaning time.

	Early weaned foals	Normally weaned foals
One week pre-weaning	21.22±3.22 <sup>a</sup>	20.52±2.56 <sup>a</sup>
2 days post- weaning	29.31±4.34 <sup>a</sup>	25.41±5.33 <sup>b</sup>
One week post- weaning	25.24±3.55 <sup>a</sup>	22.52±5.59 <sup>b</sup>

- Means with different superscripts in each row are different at level (P<0.05).

The influence of weaning time on some maintenance behaviour of foals was shown in table (1). The overall mean eating time in early weaned foals was lower than normal weaned foals, this may be due to normal development of ingestive behaviour in normally weaned foals which spent more time in contact with their mothers. Concerning the overall mean of standing alert, standing rest and lying in early weaned foals was 4.55±1.32, 14.51±2.32 and 12.53±3.42, respectively, while in normal weaned foals it was 4.12±1.53, 15.54±3.22 and 13.71 ±3.12. It was clear that resting behaviour was higher in normally weaned foals than early weaned foals. These results agree with that recorded by *Saleem and Youssef (1996)* who noticed that resting behaviour in foals may reflect the level of relaxation or anxiety in foals.

Regarding the body weight of foals in relation to weaning time the results in table (2) showed that there was a significant difference in body weight between early weaned foals and normally weaned foals. Normally weaned foals had more body weight gain than early weaned foals. This may be due to normally weaned foals engaged in eating and resting behaviour more than early weaned foals. These results are in agreement with that reported by *Winskill et al. (1995)*.

Concerning the mean frequency/h. of some stereotypies behaviour in relation to weaning time as showed in table (3). The mean frequency of steps, head threat, bite threat, bite, kick threat and kick was 51.52±5.31, 3.52±1.22, 2.21±0.82, 1.55±0.53, 2.56±1.51 and 1.41±0.62

respectively. While it was  $42.51 \pm 4.33$ ,  $1.24 \pm 0.62$ ,  $1.54 \pm 0.53$ ,  $0.52 \pm 0.22$ ,  $1.52 \pm 0.21$  and  $0.51 \pm 0.31$  in normally weaned foals respectively, it was clear that the stereotypies behaviour was more in early weaned foals than normally weaned foals, this may be due to stressful stimuli of early weaning of these foals.

These results agree with that recorded by *Mason (1991)* who stated that environmental stress factors cause development of abnormal behaviour.

Results in table (4) showed that the mean level of cortisol hormone in early weaned foals was  $21.22 \pm 3.22$ ,  $29.31 \pm 4.34$  and  $25.24 \pm 3.55$  ng/ml at one week pre-weaning, two days post-weaning and one-week post-weaning respectively, while it was  $20.52 \pm 2.56$ ,  $25.41 \pm 5.33$  and  $22.52 \pm 5.59$  ng/ml at the same interval respectively.

There was a significant difference in cortisol level between early weaned foals and normally weaned foals i.e. cortisol hormone was higher the early weaned foals this may be due to psychological stress of these foals which considered as a powerful activators of endocrine responses.

These results are in agreement with that reported by *Fraser et al. (1975)* who stated that animal that exhibit a higher level of plasma cortisol are in a state of stress.

In conclusion weaning of foals at 5 months of age was less stressful, more comfort and achieve good welfare for foals than early weaning.

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تأثير وقت الفطام على سلوك وكفاءة النمو في الأمهار العربية

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أجريت هذه الدراسة بمزارع الخيول بمحافظة الشرقية لمعرفة مدى تأثير وقت الفطام على سلوك وكفاءة النمو في الأمهار العربية وبدأت الدراسة من أول ديسمبر 2003 حتى نهاية يونيو 2004 وتم استخدام عدد 10 أمهار عند عمر ما بين 3-8 شهور وتم تقسيمهم إلى مجموعتين: المجموعة الأولى تشمل خمسة أمهار تم فطامها عند عمر ثلاثة شهور والمجموعة الثانية تم فطامها طبيعياً عند عمر خمسة شهور.

ولوحظ سلوك الأمهار بعد الفطام في المجموعتين وكان متوسط الوقت المستغرق في الأكل والرقاد أقل في المجموعة الأولى عنه في المجموعة الثانية بينما تقضى أمهار المجموعة الثانية وقتاً أقل في وضع الوقوف.

وقد لوحظ أيضاً أن أمهار المجموعة الأولى كانت أقل وزناً في الجسم من المجموعة الثانية. وتم دراسة السلوكيات الغير نمطية في المجموعتين ولوحظ أنها تكون أعلى في المجموعة الأولى عنه

في المجموعة الثانية.

وتم قياس مستوى هرمون الكورتيزول في المجموعتين قبل وبعد الفطام وقد لوحظ أن هناك اختلاف معنوي واضح في مستوى هرمون الكورتيزول بين المجموعتين خاصة بعد عملية الفطام وكان أعلى في المجموعة الأولى عنه في المجموعة الثانية.

ويستخلص من هذا البحث أن فطام الأمهار عند عمر 5 شهور يمثل عامل أقل إجهادا على الأمهار وكذلك أفضل على سلوك وكفاءة النمو وعدم ظهور السلوكيات الغير نمطية في الأمهار عنه عند عمر ثلاثة شهور.