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RESEARCH ARTICLE

Study of Incisor malocclusion in Family Muridae (Rodents) Sindh, Pakistan

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Abstract

Malocclusion is malposition of the teeth that prevents alignment of the teeth in jaws, making rodents unable to chew hard food and developing sour in mouth parts. In order to examine the population of rodents affected with Malocclusion, District Dadu, Larkana and Jacobabad of Sindh were surveyed from 2006-2009.Only10 individuals were recorded to be affected with malocclusion out of 127 collected and examinedindividuals of Muridae family.

Introduction

Rodents possess monophyodont teeth, i.e. only one set of teeth during life time, arranged in four opposing incisors (two smaller on upper jaw and two longer curved incisors in lower jaw) and total 12 molars towards back of the mouth (three on each side of the jaw, both upper and lower) (Crossley, 1995; Kertesz,1993). The incisor teeth in rodents are chisel shaped due to back and forth movement of jaws during gnawing, making rodents to gnaw effectively and have an open root which help them to grow continuously at approximately 4-5 inches per year.In healthy rodents the incisor teeth are properly aligned (Wiggs and Lobprise, 1990; Peters and Balling, 1999).

In malocclusion teeth turns to be deformed, allows teeth to over grow and curve them in ring like structure which is named as upper protrusion (buck teeth) which means the upper front teeth are pushed outward. This condition in rodents results in damage to soft palate, infection, abscesses, discomfort, pain and feeding problems to rodents which eventuallylead rodents to starvation(Petznek and Kappler, 2002).

Malocclusion may occur due to injury such as loss of tooth during root damage or trauma or may also occur due to dental diseases (Zegarelli, 1944),genetics, tumors or other non-infectious reasons (Miller, 1977).

Clinical signs of malocclusion: Effected Rodents salivate, rub their mouth with their feet, exude a foul odor from their mouth, overgrowth or uneven growth of incisor teeth, inability to chew food material, weight loss, sores in or near the mouth, broken upper or lower incisor teeth (Turner, 1996).

This type of research is rarely done in Pakistan and even reported for the first time from Sindh Province.

Material and Method:

From 127 specimens of Muridae Family, 52 specimens were collected from Larkana, 42 specimens from Dadu and 33specimens were collected from Jacobabad during the years from 2006-2009.

The studied districts consist of following collection sites:

District Dadu: Mehar, Piaro, K.N. Shah, Nasirabad.

District Larkana: Berochandio, Chakar Ali, Mithodero, Dokri, Bakrani, Moen-jo-Daro, Aarija, Mesodero, BangulDero.

District Jacobabad: Thul, Ghariyasin.

Family Muridae specimens were captured using Metallic live trap that captured rodents without killing them. The specimens were identified by using taxonomic literature (Robert, 1970). The affected individuals with malocclusion were killed by using Chloroform and stored in glass jars containing formalin solution (Formaldehyde 10 % + water 90 %) for preservation.Unaffected or normal individuals were released alive in the field.

The skulls of all the specimens were separated from body, cleaned in water and dipped into Hydrogen peroxide till the skull muscles were got clear of for further study.

Results and Discussion:

Collected specimens were identified into four species of Family Muridae, contained in ten Genera i.e. *Rattusrattus*,*Rattusnorveigicus*, *RattusRattusrufecen*, *Rattusrattusalexanderinus*(Genus *Rattus*), *Mus musculus*, *Musboduga*(Genus *Mus*),*Godugaelliotei*(Genus *Goduga*), *Gerbillusgleadowi* (Genus *Gerbillus*), *Funambuluspenatei* (Genus *Funambulus*) and *Apodemussylviticus* (Genus *Apodemus*) were distributed randomly in three districts (Table 1). All the collected specimens were differentiated into male and female (Figure 1). The prevalence of malocclusion among male and female Muridae specimens is shown in Figure 2 and 3.

Table 1: Number of all the collected and affected rodents in studied areas

Species	Total collections	Effected specimen
District Dadu		
Rattusrattusrattus	08	02
Rattusrattusalexandrinus	03	-
Bandicotabangalinus	06	01
Mus musculus musculus	04	-
Appodemussylviticus	10	01
Rattusnorveigicus	05	-
MusBoduga	04	-
Gerbillisgleadowi	02	-
District Larkana		
Rattusrattusrattus	08	01
Funambuluspenatei	03	-
Rattusrattusrufecen	06	-
Rattusrattusalexandrinus	05	-
Rattusnorveigicus	06	01
Mus musculus musculus	05	-
Appodemussylviticus	09	02
MusBoduga	03	-
Golundaelioti	03	-
Gerbillisgleadowi	04	-
District Jacobabad		
Rattusrattusrattus	07	-
Rattusnorveigicus	03	-
Mus musculus musculus	08	-
Appodemussylviticus	12	02
Rattusfrugivorous	03	-
Total	**127**	**10**

Figure 1: Examined population of Family Muridae

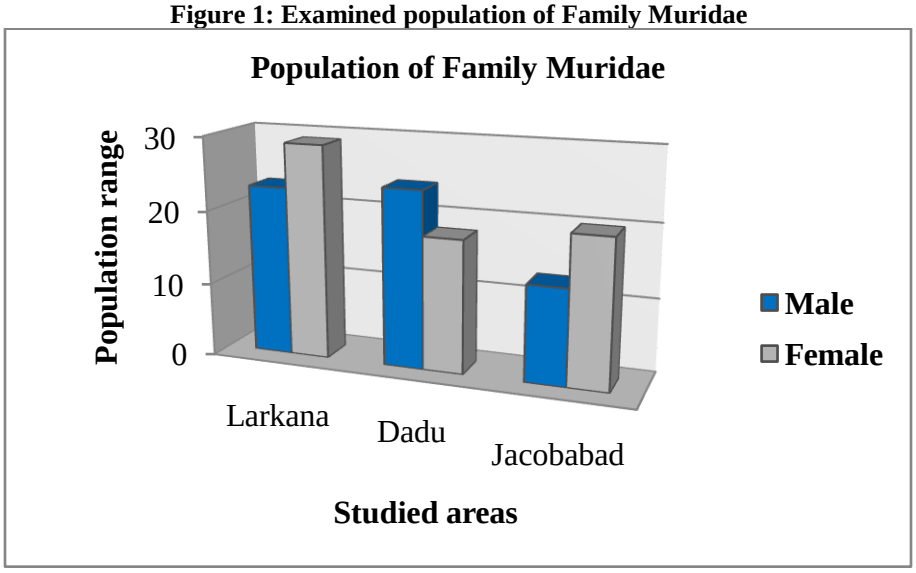


Figure 2: Family Muridae population affected with malocclusion

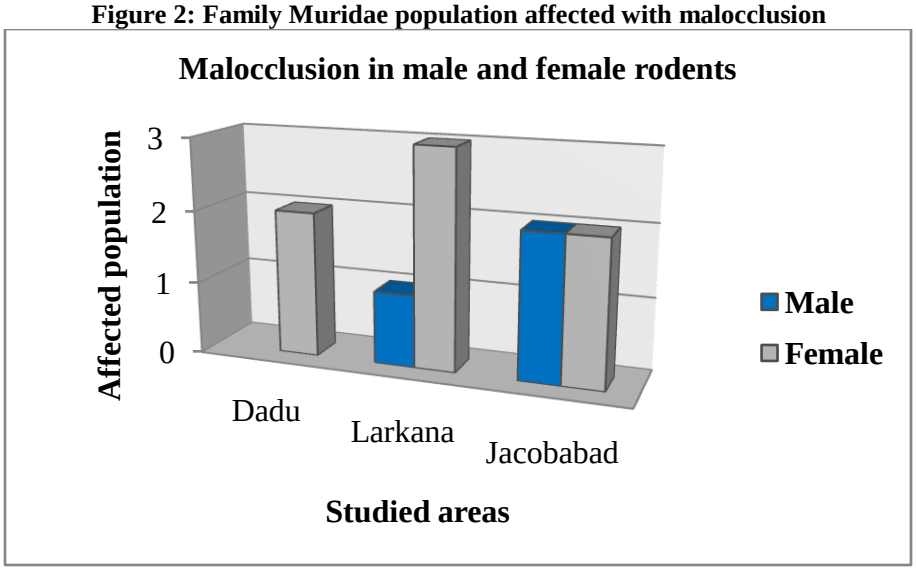
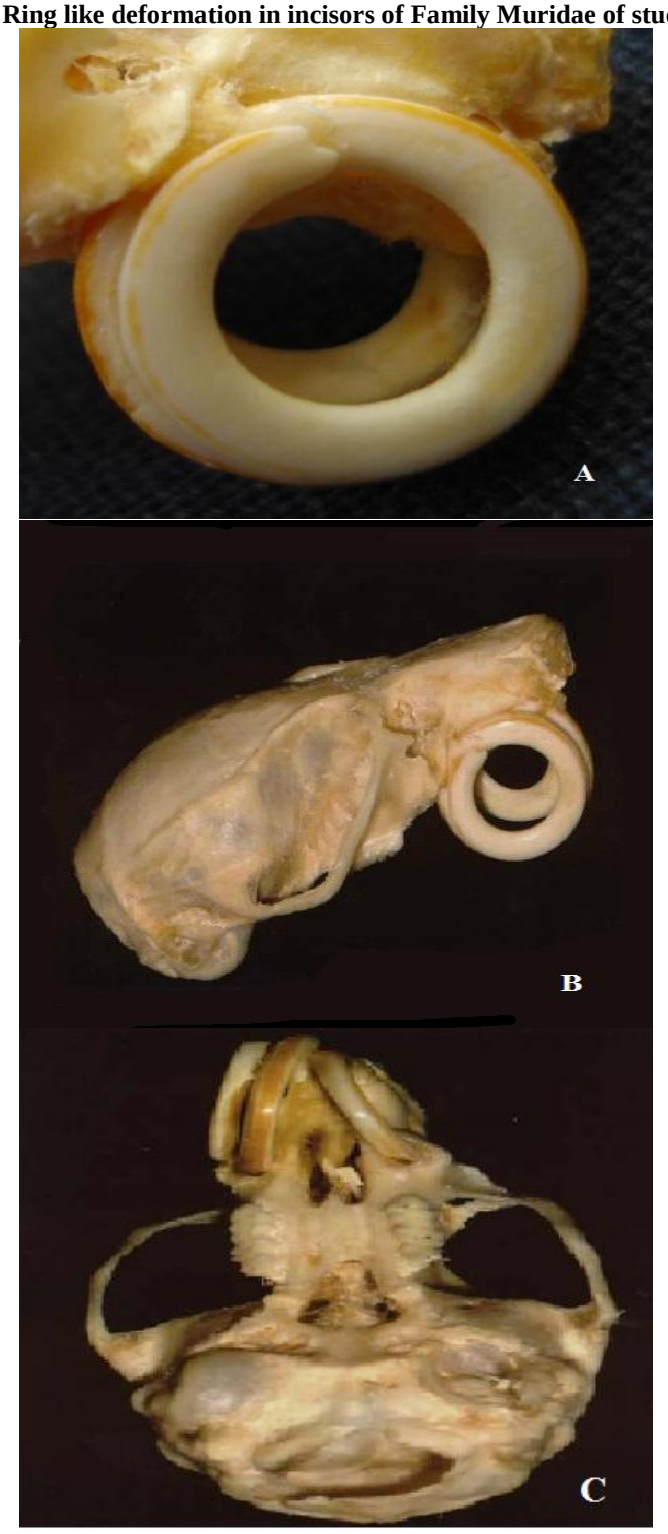


Table 2: Percentage of affected specimens of Family Muridae population

Species	Dadu	Larkana	Jacobabad
Rattusrattusrattus	4.761%	1.923%	-
Rattusrattusalexandrinus	-	-	-
Bandicotabangalinus	2.380%	-	-
Mus musculus musculus	-	-	-
Appodemussylviticus	2.380%	3.846%	3.846%
Rattusnorveigicus	-	1.923%	-
MusBoduga	-	-	-
Gerbillisgerbillis	-	-	-

Figure 3: Ring like deformation in incisors of Family Muridae of studied areas



The rodent species were randomly collected from fields ofrice, sourgum, Sugar cane, tomatoes and other cultivated and non-cultivated areas of District Dadu, Larkana and Jacobabad. The examination and deep study of skull exhibited that the presence of malocclusion is rarely foundin populations of Family Muridae from explored areas (Table 1).

The female number was found to be more affected with malocclusion in comparison to male population (Fig. 1-2). The members of Family Muridae in District Dadu and Larkana wererecorded to be more affected with malocclusion than District Jacobabad. The population of *Appodemussylviticus*specie of Family Muridae was observed to be most affected in all the studied stations, while *Rattusrattusrattus* has second highest position so for malocclusion is concerned in Dadu and Larkana only (Table 2).
Percentage of affected specimens exhibits rare occurrence of malocclusion in Family Muridae inhabiting three main districts of Sindh (Figure 3).

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