

## CHAPTER I



### INTRODUCTION

Muscles are highly specialized organs, which are characterized by their property of contracting in a definite manner when stimulated. Each muscle fiber is surrounded by delicate connective tissue sheath, the endomysium. Muscle fibers are grouped into fasciculi which are enclosed by perimysium. A muscle as a whole is composed of many fasciculi and is surrounded by epimysium, which is closely associated with fascia and is sometimes fused with it. Each end of the muscles is directly attached to a broad surface of bone or cartilage; but in many cases it is attached either on a tendon, a band of dense fibrous tissue, or an aponeurosis, an expansion of the tendon onto the muscle surface. Both tendon and aponeurosis are considered as the external tendon. Contrastly, the internal tendon (Heinze, 1963) arises from the external tendon, and extends within the muscle mass. The internal tendon is also named "intramuscular tendon" (Markee, et al., 1955; Iordansky, 1964).

The internal tendon had been observed and recorded in some textbook of anatomy. For example, in the anatomy of the domestic animals of Sisson (1961) suggested that the muscles were intersected by tendinous layer or bands known as tendinous intersection. In the anatomy of ox, it was also stated that the masseter muscle was divided by tendinous bands (Raghavain, 1964).

The studies of the muscle, focused on the internal tendon was first done in the masticatory muscles of crocodiles ( Poglayen-Neuwall, 1953; Iordansky, 1964 ). Domestic animals were also studied ( Heinze, 1963, 1964, 1969; Yoshikawa & Suzuki, 1969 and Herring & Scapino, 1973 ). The internal structure of the other muscles was also investigated; for example, M. triceps surae and M. flexor digitalis pedis ( Heinze, 1969 ) and muscles of the lower extremity of man ( Gagnantadilok, 1976 ).

In the earlier investigations ( Iordansky, 1964; Yoshikawa & Suzuki, 1969 ), the results were not clear cut. Later, Heinze ( 1964, 1969 ) reported his investigation by a two-dimensional diagram. The diagram showed the ideal cross and longitudinal section of the muscle. In 1973, Herring & Scapino demonstrated their results by three-dimensional diagrams. Recently, Gagnantadilok ( 1976 ) presented his studies in three-dimensional models which were not only the best way to show the overall picture of the internal structure of the muscle but also the practical way of visualizing the function of the muscle as well.

Although the internal structures of the muscles of mastication were already studied in various animals, the comparative study of the internal structure of the muscles of mastication in dog, ox, and man has not been performed systemically, especially in the forms of three-dimensional models. It has also been known that the modes of actions of these muscles in the carnivore ( dog ), herbivore ( ox ) and omnivore ( man ) are functionally different. Therefore, compara-

tive morphological studies on the internal structure of the masticatory muscles are thus investigated in this study in order to see if knowing the arrangements of the internal tendons would provide any insights into its function.