

# METHOD OF FIXING THE HEAD OF IMMATURE AND ADULT ANIMALS IN STEREOTAXIC APPLIANCES

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A nontraumatic method of fixing the head of immature and adult animals in stereotaxic appliances is suggested. It uses two narrow, specially shaped clamps which fit over the most rigid parts of the skull and over a large part of its length.

Interest in the study of the brain during development of the organism has increased considerably in recent years. Because of this, many attempts have been made to overcome some of the difficulties associated with the use of the stereotaxic method in experiments on immature (including newborn) animals [2-6]. However, simple miniaturization of techniques widely used at the present time, as suggested by some workers, is not always successful. In newborn animals, in which the formation of the external auditory meatus is not yet complete, the use of halters fixed to the ears is invariably traumatic. Other methods of rigid fixation of the head in stereotaxic appliances usually lead to considerable deformation of the skull, and to undesirable elevation of the intracranial pressure, or else they are insufficiently effective (hitherto investigators have been forced to bind the head with bandages to the holder, to encase it in plaster of paris, to increase the number of supports, to fit them with pins, and so on).

The writer suggests a method of fixation which is largely free from these disadvantages and which can also be used for work on adult animals (Fig. 1). The animal's head rests on a specially shaped clamp (a), which fits against the skull over a considerable length in the region of the nasal, maxillary, and temporal bones. If the support for this clamp is correctly adjusted, the head is automatically held in the sagittal plane of the stereotaxic appliance. The head is securely fixed in this "bed" by means of an additional device consisting of an arch (b) which fits against the head in the occipital region. The head holder, with the head fixed in it, can then be raised or lowered according to the requirements of the stereotaxic atlas used.

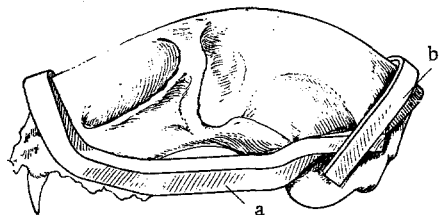


Fig. 1. Diagram showing suggested method of fixation as used on an adult cat (explanation in text).

An alternative design of the head holder for newborn kittens and rabbits is shown in Fig. 2. Its main parts are made of metal covered with thin plastic or rubber for heat insulation. The complete model can be fixed by means of a simple device to any stereotaxic apparatus. It is compact and allows free access to the external auditory meati, the orbits, the trachea, and so on. A holder of this type is nontraumatic, and it fits to the skull by its most rigid parts, so that its mobility in the holder is determined entirely

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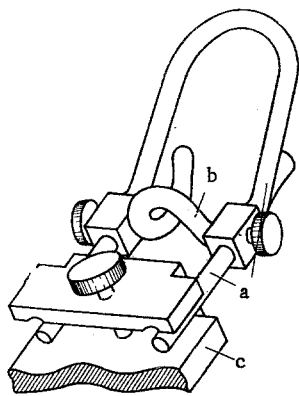


Fig. 2. General view of head holder for newborn animals: a) detachable supporting clamp; b) fixing arch (by means of it, the entire head holder in this case is fixed to the stereotaxic apparatus); c) support for maxilla of standard stereotaxic apparatus.

from the standard or from the average for its own age group. This is a particularly important factor when working with developing animals.

by the elasticity of its component parts. The mobility of the skin covering the head is reduced to a minimum in this type of holder.

Tests have shown that during working with immature animals it is not absolutely essential to depart from the established principles developed primarily for work with adult animals [1], such as the use of calculations relative to imaginary lines or planes: "bregma - lambda," the "horizontal basal plane." Great accuracy can be obtained by the use of direct measurement from bony reference points, such as from the surface of the skull, which is more convenient when this method of fixation is used. Observations have shown that the position of an investigated structure in the skull can be most conveniently predicted relative to a combination of points of the skull surface (the contours of the cranial and facial parts of the skull), regardless of the degree to which the particular skull differs

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