Anthropometry in the CIPIC HRTF Database

The CIPIC HRTF database includes a set of anthropometric measurements that can be used for scaling studies.

The specification of a general and sufficient set of well-defined and relevant anthropometric measurements is an unresolved problem. It is particularly difficult for the pinna, where small variations may produce large changes in the HRTF.

The anthropometric parameters that were chosen are broadly relevant to understanding or estimating HRTFs and follow an approach proposed by Genuit (See the "CIPIC HRTF database" paper for references). We define a set of 27 anthropometric measurements — 17 for the head and torso (Fig. 1) and 10 for the pinna (Fig. 2). In general, a particular measurement was included if (a) it was deemed to have a significant influence on the HRTF, and (b) it could be reliably and reasonably easily measured.

Most anthropometric parameters were extracted from high resolution digital photographs. The height and circumference parameters x_{14} , x_{15} , x_{16} , x_{17} defined in Fig. 1 were measured with a tape. The concha depth, d_8 and flare angle of the pinna, θ_2 , were measured with a Polhemus 3D stylus digitizer. The flare angle is defined with reference to a plane tangent to the head around the pinna that is also determined by 3D data acquisition with the stylus digitizer. Sex, age and weight are additional anthropometric parameters reported by the subject that are included in the database but that not shown in the figures.

MeasurementVar head width x_1 head height x_2 head depth x_3 pinna offset down x_4 pinna offset back x_5 neck width x_6 neck height x_7 neck depth x_8 torso top width x_9 torso top height x_{10} torso top depth x_{11} shoulder width x_{12} head offset forward x_{13} height x_{14} seated height x_{15} head circumference x_{16} shoulder circumference x_{17} d_1 cavum concha height d_2 cymba concha height cavum concha width d_3 fossa height d_4 pinna height d_5 pinna width d_6 intertragal incisure width d_7 d_8 cavum concha depth

pinna rotation angle

pinna flare angle

 θ_1

 θ_2

Table 1. Anthropometric parameters

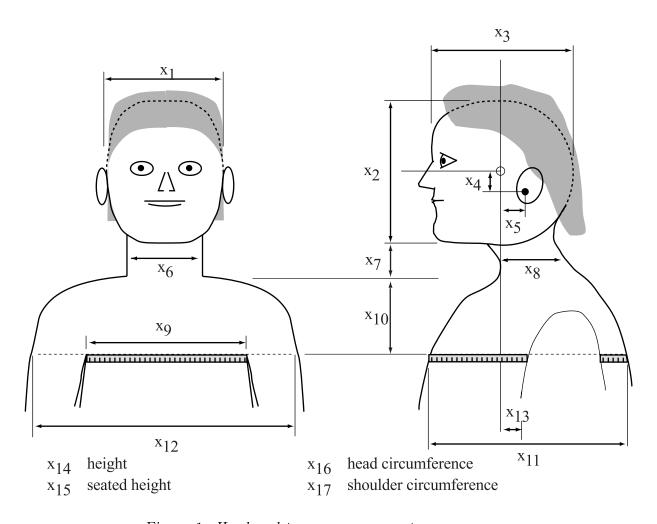
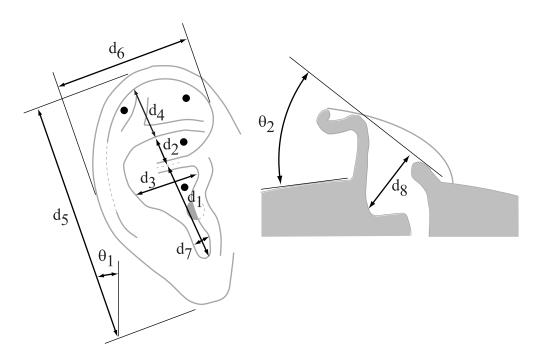


Figure 1: Head and torso measurements



 $Figure \ 2: \ Pinna \ measurements$