

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.

Var	Measurement
x_1	head width
x_2	head height
x_3	head depth
x_4	pinna offset down
x_5	pinna offset back
x_6	neck width
x_7	neck height
x_8	neck depth
x_9	torso top width
x_{10}	torso top height
x_{11}	torso top depth
x_{12}	shoulder width
x_{13}	head offset forward
x_{14}	height
x_{15}	seated height
x_{16}	head circumference
x_{17}	shoulder circumference
d_1	cavum concha height
d_2	cymba concha height
d_3	cavum concha width
d_4	fossa height
d_5	pinna height
d_6	pinna width
d_7	intertragal incisure width
d_8	cavum concha depth
θ_1	pinna rotation angle
θ_2	pinna flare angle

Table 1. Anthropometric parameters

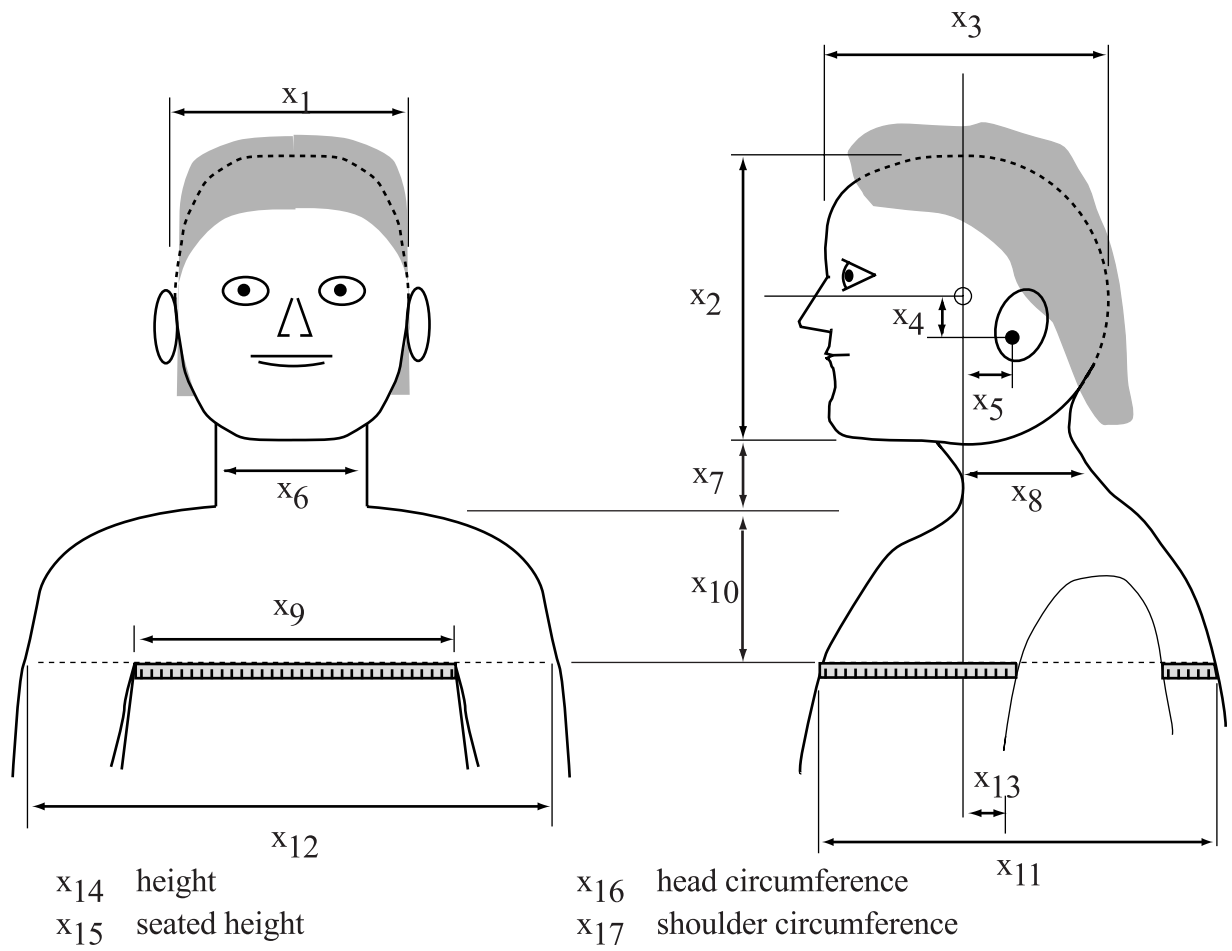


Figure 1: *Head and torso measurements*

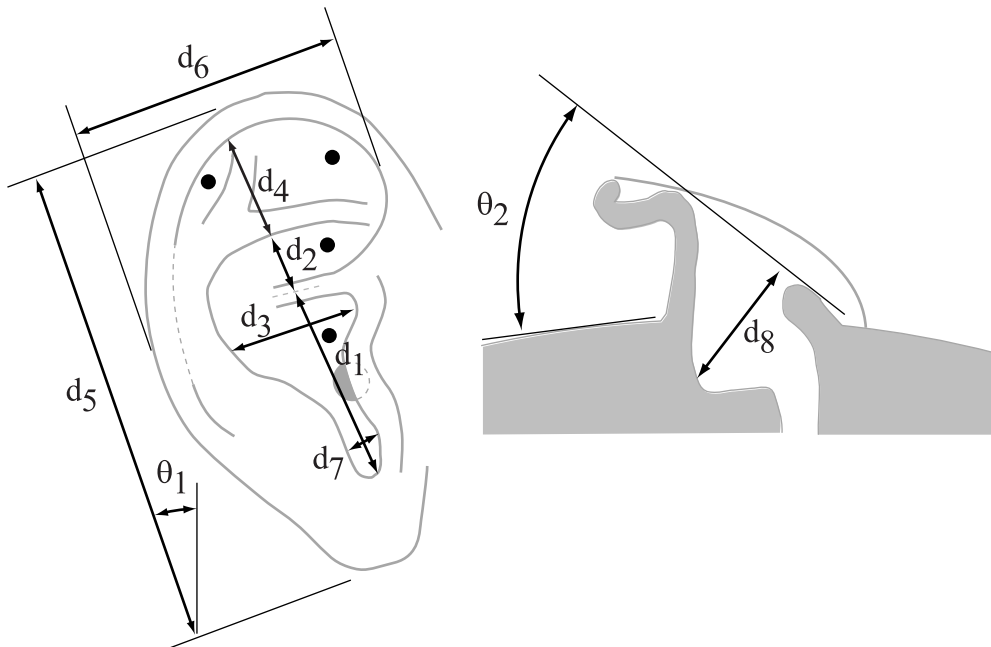


Figure 2: *Pinna measurements*