

intervariable lines correspond to the probable functional association as indicated by stepwise regression. According to the model a significant relation between pairs of variables does not necessarily imply a cause-effect relationship, since such a mathematical association may be the result of interdependence with a third variable.

The results show that in this population only three variables explain more than 50 per cent of family size variation, which represents a high value as compared to that mentioned in the cited literature. However, other factors not included here, such as inbreeding or social class, cannot be excluded to have a reduced part in the variability not explained by stepwise regression.

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An anthropometric study of the ear in an adult population¹

A sample of 539 individuals, 188 males and 351 females from 35 to 93 years, from a rural area, were studied in order to show ear variability according to age and sex. The characters analyzed were: maximum length and breadth, lobe type, and their possible asymmetries. The individuals were also searched for Darwin's tubercle.

Key words: ear asymmetries, Spain.

Introduction

There are several human morphological and physiological characters which change with age, sex and race. In this paper, we deal with one of these: ears. The ear is defined as a skinfold sustained by a cartilaginous lamina which surrounds the external auditory canal.

This character has been studied by Leguebe (1971), Susanne (1974), Marquer (1978), Montagne (1979) and Deblock (1982). Codina (1983) dealt with the morphological height and breadth of the ear of a children population in Barcelona, and Rebato (1983) studied an adult Basque population.

Material and Methods

The sample analyzed in this paper consists of 539 individuals, 138 men and 351 women. They were examined and measured in the Lozoya-Somosierra area, in the north of Madrid, between 1981 and 1982. Their ages range from thirty-five and ninety-three. All of them are engaged in agriculture and cattle breeding. (Table 1, Figure 1).

Observed characters are: maximum ear length, maximum ear breadth, lobe type, Darwin's tubercle and asymmetries (Figure 2).

A compass has been used to measure length and breadth. For lobe type a classification has been made by direct observation of both lobes separately. Types are free adherent and intermediate. We have followed the classes given by Martin and Saller (1961). We calculated the asymmetries between right and left ears, according to the Z-ratio of Downie and Heath (1975).

Results

1. Maximum ear length:

We separately studied right and left ears for men and women. We can say that: — this parameter increases with age,

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TABLE 1. - Distribution of sample by sex and age.

Age	Males	Females	Total
35-39	6	17	23
40-44	12	23	35
45-49	16	38	54
50-54	14	57	71
55-59	27	57	84
60-64	28	47	75
65-69	28	35	63
70-74	30	30	60
75-79	19	27	46
80-93	8	20	28
Total	188	351	539

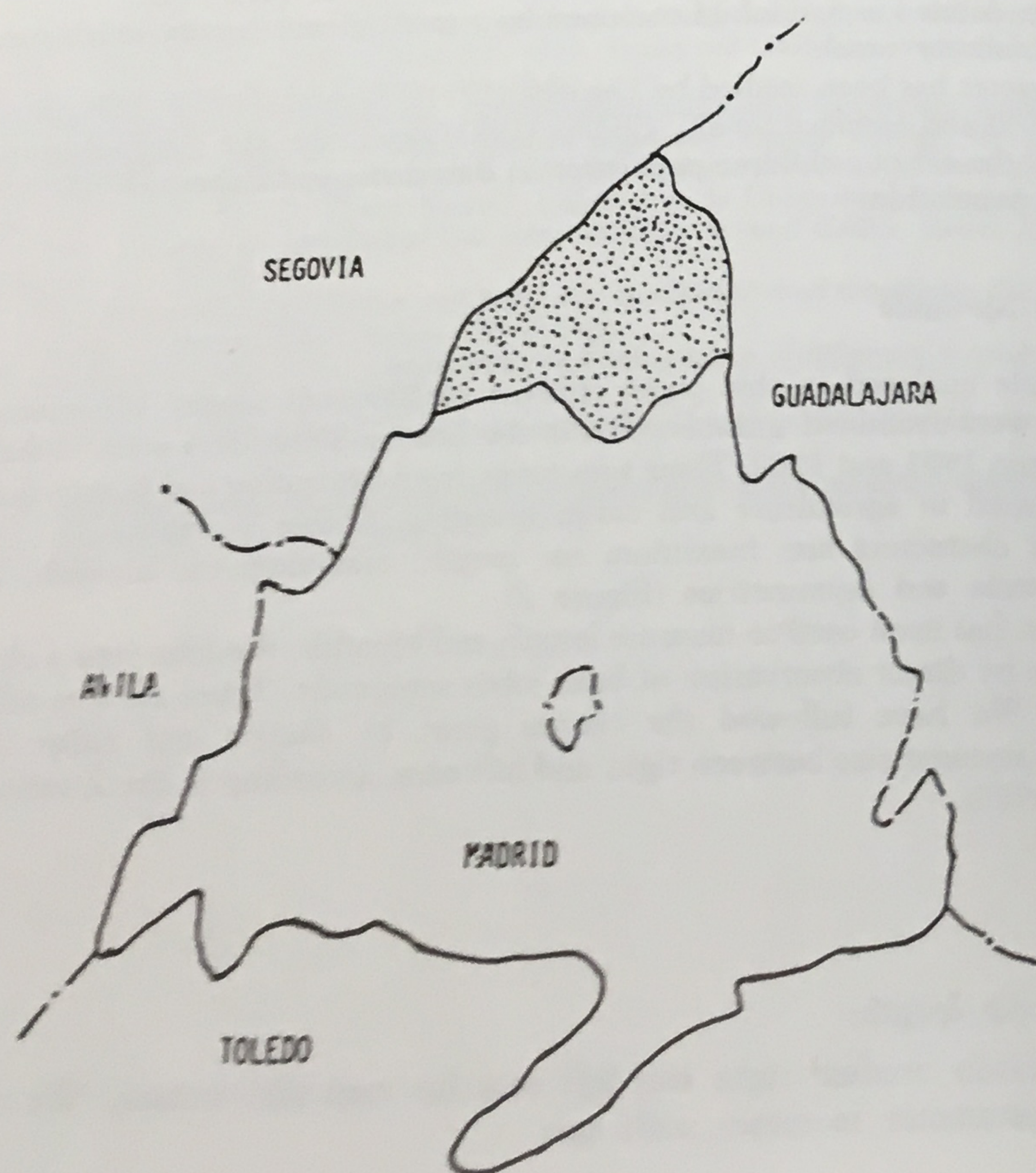


Fig. 1 - Geographical situation of the Lozoya-Somosierra area inside the province of Madrid.

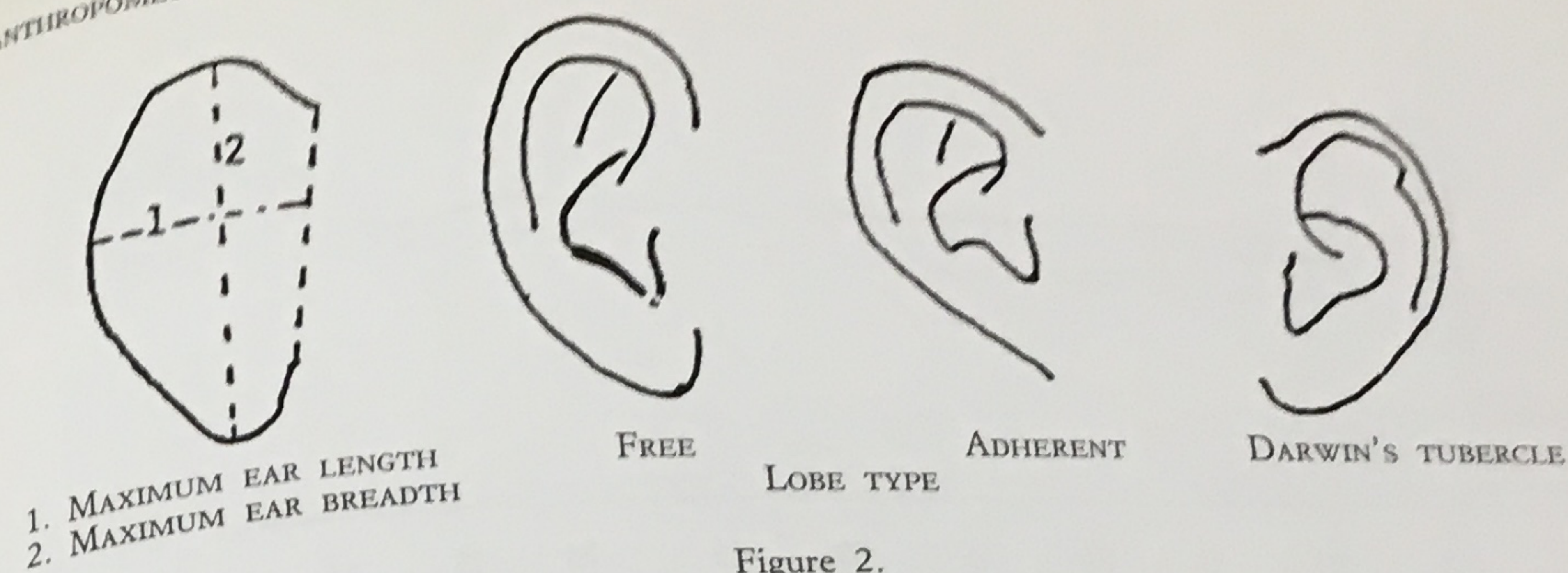


Figure 2.

— men's ears are longer than women's ears,

— both men and women have longer left ears than right ears.

In order to know if the ear length presents sexual dimorphism, we had to calculate the Student's t-statistics. From this analysis, we concluded that differences between masculine and feminine series are not random. (Table 2, Figure 3).

2. Maximum ear breadth:

A slight increase with the age is observed for this character. We did not observe a clear sexual dimorphism, or any differences between right and left ears. (Table 3, Figure 4).

3. Lobe type:

Most men between 35 and 54 have adherent lobe type. From that age to 93 we have found a larger number of free lobes in both ears. There is no evidence to point out sexual dimorphism in this character. We can say more generally that the major percentage belongs to free lobe type, and the minor is that of intermediate lobes. (Figure 5).

For the 359 women, we can say that they have the free lobe type, which includes 47,71 percent of right ears and 45,30 percent of left ears. Adherent lobes are more frequent

TABLE 2. - Maximum ear length: mean values.

Age	Nº	Males R	L	Nº	Females R	L
35-39	6	6,27	6,33	17	5,92	5,92
40-44	12	6,37	6,55	23	5,86	5,87
45-49	16	6,57	6,54	38	6,03	6,13
50-54	14	6,55	6,59	57	6,04	6,12
55-59	27	6,55	6,63	57	6,12	6,21
60-64	28	6,58	6,71	47	6,19	6,28
65-69	28	6,75	6,68	35	6,38	6,51
70-74	30	6,81	6,82	30	6,43	6,48
75-79	19	6,55	6,61	27	6,43	6,51
80-X	8	7,29	7,44	20	6,68	6,76

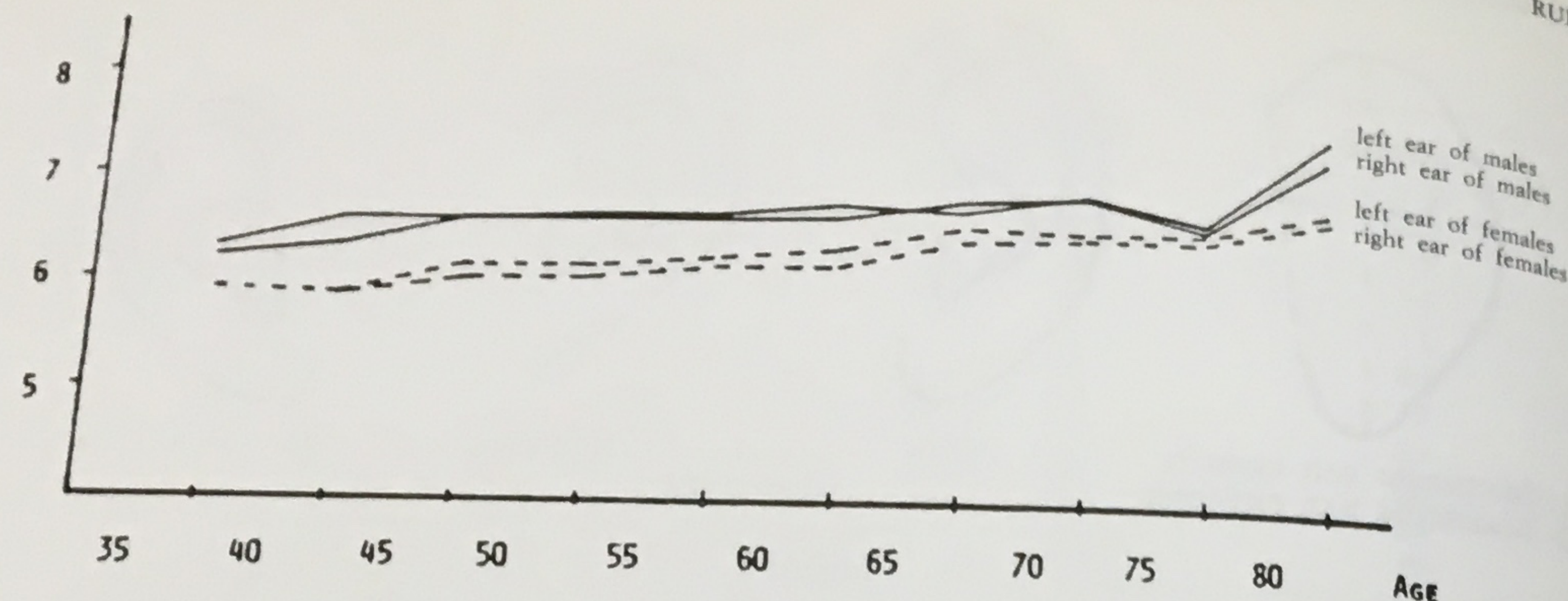


Fig. 3 - Maximum ear length by age groups.

TABLE 3. - Maximum ear breadth: mean values.

Age	Nº	Males R	L	Nº	Females R	L
35-39	6	3,30	3,22	17	3,08	3,08
40-44	12	3,44	3,30	23	3,03	2,99
45-49	16	3,31	3,37	38	3,14	3,15
50-54	14	3,27	3,24	57	3,15	3,11
55-59	27	3,17	3,13	57	3,22	3,20
60-64	28	3,16	3,15	47	3,14	3,21
65-69	28	3,07	3,10	35	3,28	3,31
70-74	30	3,29	3,24	30	3,17	3,21
75-79	18	3,17	3,15	27	3,29	3,32
80-X	8	3,34	3,30	20	3,27	3,31

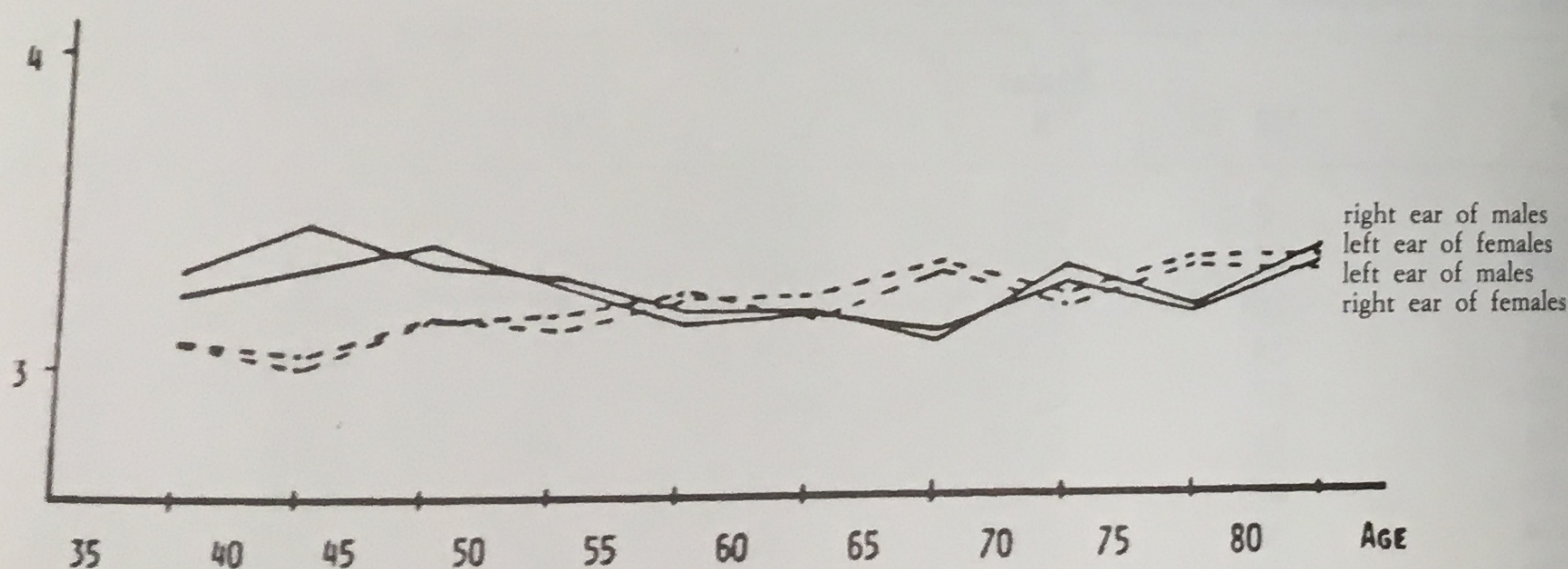


Fig. 4 - Maximum ear breadth by age groups.

between 35 and 54 years. After 54, free lobes are more numerous. There is no sexual dimorphism. (Table 4).

After that, we have calculated χ^2 between men and women. As a result $\chi^2 = 6,38, 2gl$, $p 5.2\%$ indicates that it is at the limit of significance. There is no sexual dimorphism.

4. Darwin's tubercle:

Only 10,41% of the individuals have a Darwin's tubercle. It has been observed that there is a greater occurrence in left ears for men (53,57%), but frequency is the same in both ears for women. (Table 5).

As indicated by Martin and Saller (1961) frequencies of Darwin's tubercle in both or in one ear in men is 3,19 and 8,51% respectively. Women more frequently have non-tubercled ears (93,43% against 88,30%). (Table 6).

5. Ears asymmetries:

Length: Average differences for men between right and left ears are negative for most ages analyzed. This means that the left ear is bigger than the right one. T-statistics is significant for age groups 40-44, 55-59, 60-64, 65-69, 80-X. We conclude that in those ages there is an ear reduction. (Table 7).

Differences between left and right ears are negative for women at every age. Therefore, the left side prevails on the right side. T-statistics are significant for the 45-49 to 80-X year group and we conclude that there is a reduction in the left predominance as age increases.

Breadth: Average differences are positive, except for age groups 45-49 and 65-69, with a left side predominance. Statistical significance rises in the 40-44 group, with a right ear predominance. As for women, there is a statistically significant left side dominance which is clear for age groups 50-54 and 60-64. (Table 8, Figures 6, 7).

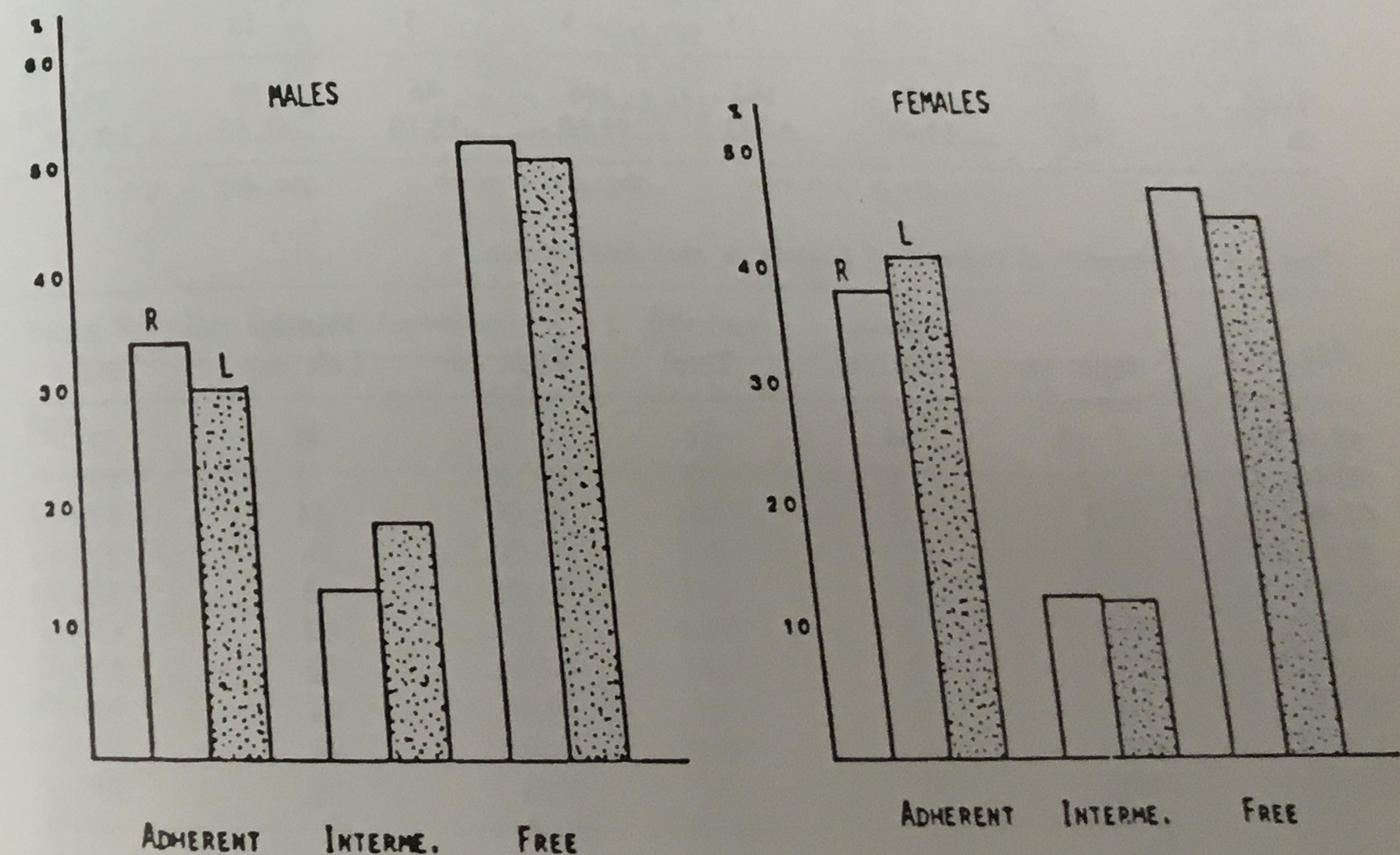


Fig. 5 - Percentual distribution of ear's lobe in men and women.

TABLE 4. - Type of lobe present on the same males and females.

Age	Males						Total
	A	Right ear I	F	A	Left ear I	F	
35-39	3	1	2	3	1	2	6
40-44	1	4	7	—	5	7	12
45-49	9	1	6	9	1	6	16
50-54	8	2	4	8	2	4	14
55-59	6	5	16	7	5	15	27
60-64	11	4	13	9	6	13	28
65-69	11	4	13	9	6	13	28
70-74	11	4	15	10	6	14	30
75-79	3	—	16	2	2	15	19
80-X	2	1	5	1	2	5	8
Total	65	26	97	58	36	94	188
%	34,57	13,83	51,60	30,85	19,15	50,00	100,00

Age	Females						Total
	A	Right ear I	F	A	Left ear I	F	
35-39	93	1	7	10	—	7	17
40-44	11	4	8	11	3	9	23
45-49	19	9	9	19	10	9	38
50-54	29	7	21	29	6	22	57
55-59	24	2	31	30	3	24	57
60-64	22	10	15	22	10	15	47
65-69	5	7	23	5	7	23	35
70-74	9	2	19	9	2	19	30
75-79	4	2	21	6	2	19	27
80-X	4	3	13	5	3	12	20
Total	136	47	167	146	46	159	351
%	38,86	13,43	47,71	41,60	13,10	45,30	100,00

TABLE 5. - Frequency of tubercle of Darwin in men and women.

Age	Males			Females		
	Right ear	Left ear	Total	Right ear	Left ear	Total
35-39	1	—	6	1	—	17
40-44	2	1	12	2	1	23
45-49	1	2	16	3	4	37
50-54	1	2	14	3	—	57
55-59	2	2	27	1	3	57
60-64	3	2	28	2	2	47
65-69	2	2	28	1	2	35
70-74	—	3	30	—	—	30
75-79	—	—	19	—	—	27
80-X	1	1	8	1	2	20
Total	13	15	188	14	14	350
%	46,43	53,57		50,00	50,00	

TABLE 6. - Frequency of tubercle of Darwin in men and women.

Age	Males				Females			
	Both ears	In Only one ear	Not one ear	Total	Both ears	In Only one ear	Not one ear	Total
35-39	—	1	5	6	—	1	16	17
40-44	1	1	10	12	1	1	21	23
45-49	1	1	14	16	2	3	32	37
50-54	1	2	24	27	1	3	54	57
55-59	1	3	24	28	—	4	54	57
60-64	—	4	24	28	—	3	43	47
65-69	—	3	27	30	—	—	32	35
70-74	—	—	19	19	—	—	30	30
75-79	1	—	7	8	1	1	27	27
80-X	—	—	—	—	—	—	18	20
Total	6	16	166	188	5	18	327	350
%	3,19	8,51	88,30		1,43	5,14	93,43	

TABLE 7. - Ear length: Asymmetry. R - L differences.

Age	N°	Males		N°	Females	
		R - L	Z		R - L	Z
35-39	6	-0,06	-0,785	17	0,00	0,000
40-44	12	-0,18	-3,721***	23	-0,01	-0,597
45-49	16	0,03	0,882	38	-0,10	-8,838***
50-54	14	-0,04	-1,014	57	-0,08	-9,428***
55-59	27	-0,08	-2,480**	57	-0,09	-10,606***
60-64	28	-0,13	-4,596***	47	-0,09	-6,181***
65-69	28	0,07	2,445**	35	-0,13	-8,928***
70-74	30	-0,01	-0,392	30	-0,05	-2,044*
75-79	19	-0,06	-1,916	27	-0,08	-5,494***
80-X	8	-0,15	-2,971***	20	-0,08	-3,162***

* P = 2%-5%

** P = 1%-2%

*** P = 0,1%-1%

TABLE 8. - Ear Breadth: Asymmetry. R - L differences.

Age	N°	Males		N°	Females	
		R - L	Z		R - L	Z
35-39	6	0,08	1,196	17	0,00	0,000
40-44	12	0,14	2,109*	23	0,04	1,556
45-49	16	-0,06	-1,030	38	-0,01	-0,438
50-54	14	0,03	0,708	57	0,04	2,309*
55-59	27	0,04	0,979	57	0,02	1,264
60-64	28	0,01	0,279	47	-0,07	-4,427***
65-69	28	-0,03	-0,809	35	-0,03	-1,011
70-74	30	0,05	1,074	30	-0,04	-1,807
75-79	18	0,02	0,489	27	-0,03	-1,315
80-X	8	0,04	0,559	20	-0,04	-1,581

* P = 2%-5%

** P = 1%-2%

*** P = 0,1%-1%

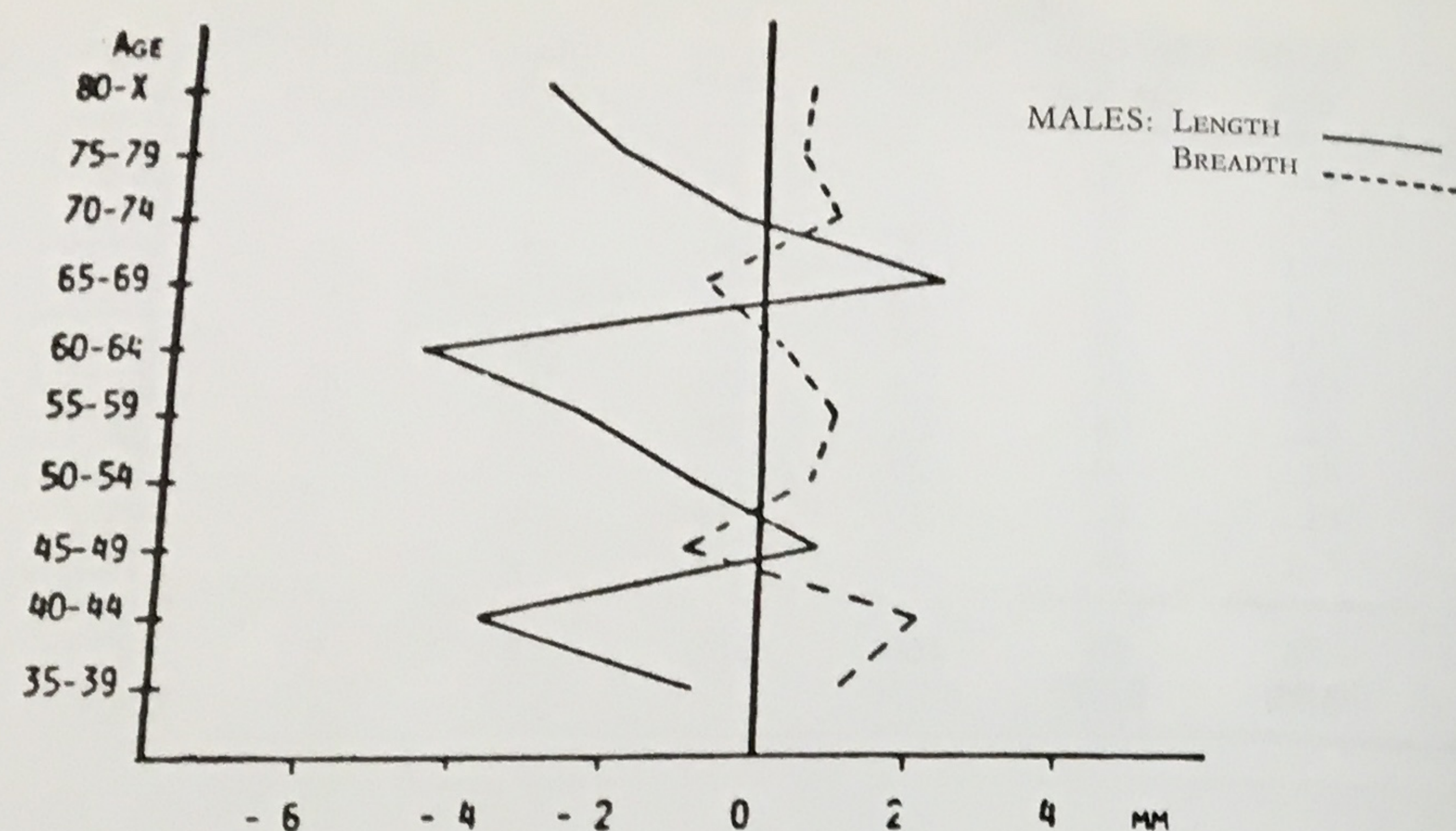


Fig. 6 - Asymmetries: R - L differences.

Conclusions

1. Ears length grows with age. Men have longer ears than women. Left ears are larger in both sexes.
2. Breadth presents a slight increase with age, which is a bit larger for women than for men.
3. Higher frequencies of free and intermediate lobes are observed in men; nevertheless, major percentage of adherent types arise in women.

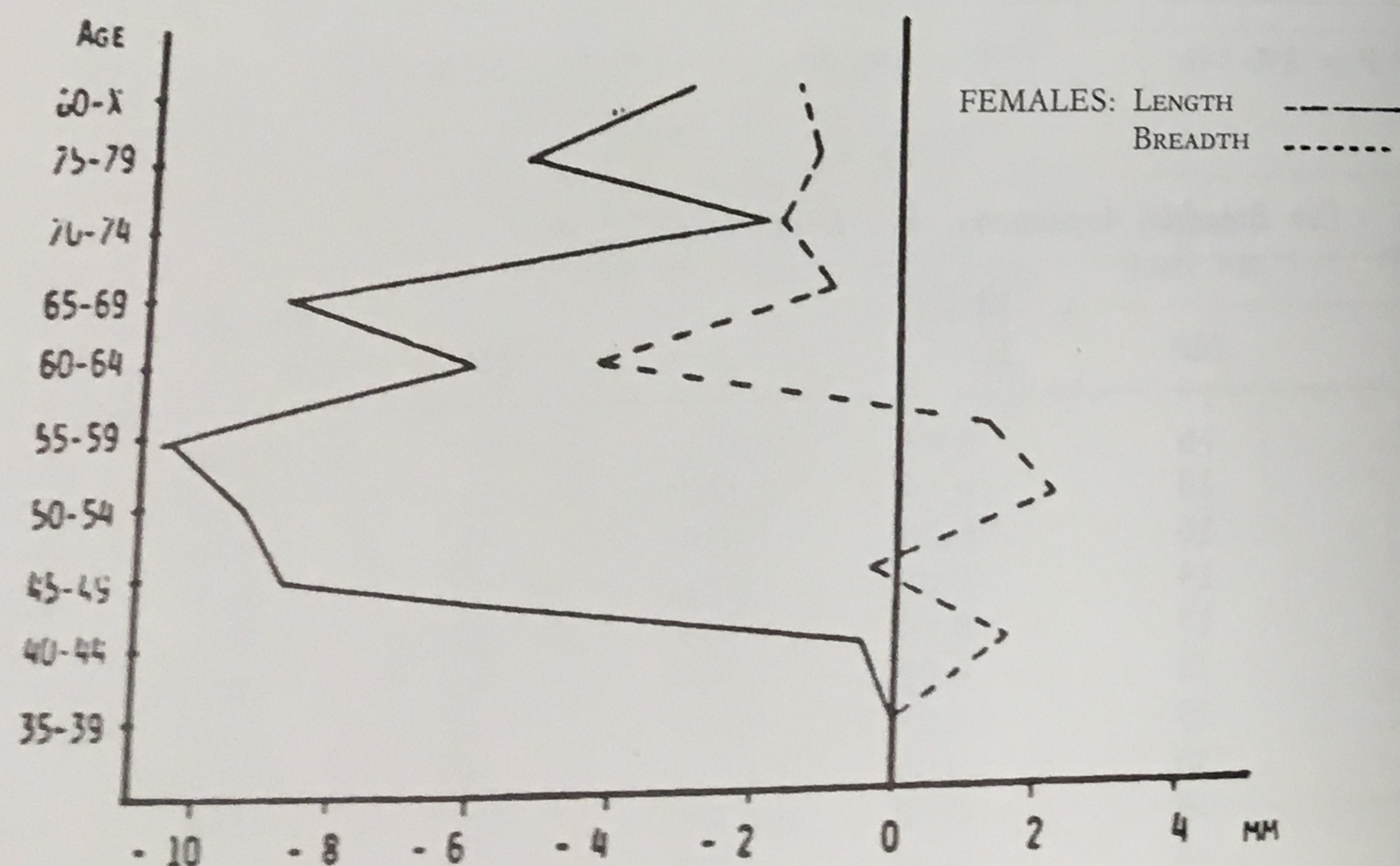


Fig. 7 - Asymmetries: R - L differences.

4. Darwin's tubercle in both or in one ear arise in men very often. Women have a major percentage of ears without a Darwin's tubercle.
5. Ears show a length asymmetry. The left ear is longer in both men and in women. Men present more breadth asymmetry than women.

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