

정상인과 감각신경성 난청인에서 불쾌역치와 등골근반사역치의 비교

서옥기¹ · 이정학² · 박문서² · 정명현¹

Comparison of the Uncomfortable Loudness Level with the Acoustic Reflex Threshold in Normal and Sensory-Neurally Hearing-impaired Ears

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ABSTRACT

The purpose of this study was to investigate the relationship between the uncomfortable loudness level (ULL) and the acoustic reflex threshold (ART) for puretones in normal ears and ears with sensorineural hearing loss (SNHL). ULLs and ARTs were obtained from 73 normal ears and 50 ears with SNHLs at 0.5, 1, 2, 4 kHz. The results indicated that the significant differences between the ULL and the ART were shown in normal ears, but not in SNHL ears. According to the multiple regression analysis, the correlations between the ULL and the ART were significant in SNHL ears, but not in normal ears. (4(2):148-153, 2000)

KEY WORDS : Uncomfortable loudness level (ULL) · Acoustic reflex threshold (ART) · Sensorineural hearing loss (SNHL).

서 론

1 kHz

(Uncomfortable loudness level, ULL)

가

가

가

가

(acoustic reflex thresh-

old, ART)

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1-8)

가

analyzer) . 220 Hz
 (continuous tone) 0.5,
 1, 2, 4 kHz (pulsed tone) . 5
 dB 3 2
 compliance가 0.02 cc

가

(ipsilateral) (contralateral)

대상 및 방법

대 상

(GSI 10 clinical audi-
 ometer) 0.5, 1, 2, 4

kHz TDH 49
 Dirks Kamm
 50 dBHL

Tympanogram type A, Statistic compliance
 0.2 1.6 cc 0.5 kHz, 1
 kHz, 2 kHz 20 dBHL (
 34 , 9 59 , 10 dBHL)
 가 5 dB

3 가
 ,
 . 5
 dB 10 dB

50% 2

(55 ,
 14 80 , 55 dBHL)
 .¹³⁾ 73 (45 , 28)
 50 (28 , 22)

결 과

볼래역치와 등골근반사역치의 비교

(Table 1).

검사절차

0.5, 1, 2, 4 kHz
 102 104 dBHL,

(GSI 33 middle ear

90 97 dBHL

가

가

Table 1. Means, standard deviations (SD) and ranges of hearing thresholds in normal ears and ears with SNHL

		Frequency (Hz)			
		0.5 k	1 k	2 k	4 k
Normal	Mean	12	10	10	9
	SD	6	6	6	7
	Range	- 5 - 20	0 - 20	0 - 20	- 10 - 20
SNHL	Mean	33	40	46	55
	SD	19	17	17	17
	Range	5 - 65	5 - 60	15 - 70	15 - 80

Unit : dBHL

4 2 7 dB
 . 96 103
 dBHL, 92 dBHL
 가 3 dB

4 1 8
 dB
 가

가

가 (Table 2). (t - test, p<0.01 ; t - test, p<0.05).
 가 (t - test, p<0.05)
 불쾌역치와 등골근반사역치 차이의 비교 가 (t - test, p>0.05).

Table 3

6 9 dB(7 dB) 등골근반사역치와 불쾌역치와의 상관 관계
 8 13 dB(11 dB) 2 kHz
 가 (r = 0.255, p<0.05), 4 kHz
 4 1 dB(0 dB) (r = 0.374, p<0.01)
 0 4 dB(3 dB) 0.5 kHz
 4 (r = 0.397, p<0.01), 1 kHz
 (r = 0.428, p<0.01), 1 kHz

Table 2. ULLs and ARTs in normal ears and ears with SNHL

		Ipsi (Hz)				Cont (Hz)				
		0.5k	1k	2k	4k	0.5	1k	2k	4k	
Normal	ULL	Mean	103	104	102	102	103	104	102	102
		SD	15	16	14	17	15	16	14	17
		Range	60 - 120	55 - 125	60 - 125	60 - 120	60 - 120	55 - 125	60 - 125	60 - 120
	ART	Mean	90	91	93	93	97	95	95	95
		SD	6	7	6	7	7	8	8	8
		Range	80 - 110	75 - 110	75 - 105	75 - 105	80 - 115	80 - 115	80 - 115	75 - 115
N		73	73	73	53	73	73	73	53	
SNHL	ULL	Mean	96	99	98	100	96	97	98	103
		SD	12	14	12	16	12	12	12	16
		Range	80 - 125	75 - 125	80 - 125	80 - 125	80 - 125	75 - 125	80 - 125	85 - 125
	ART	Mean	92	95	98	98	100	96	99	102
		SD	7	7	6	3	10	8	8	8
		Range	80 - 105	75 - 105	90 - 110	90 - 105	80 - 120	80 - 115	85 - 120	90 - 120
N		47	50	43	22	47	48	43	23	

Cont : contralateral Ipsi : ipsilateral N : number Unit : dBHL

Table 3. Comparison of differences between the ULL and ART in normal ears and ears with SNHL

		Ipsi					Cont				
		0.5k	1k	2k	4k	All	0.5k	1k	2k	4k	All
Normal	Mean	12	13	9	8	11	6	9	7	7	7
	SD	16	17	16	17	17	17	17	14	16	16
SNHL	Mean	4	4	0	2	3	-4	1	-2	1	0
	SD	11	13	12	15	13	14	12	12	17	14

All : overall frequencies Unit : dBHL

Table 4. Correlation between ULLs and ARTs in normal ears and ears with SNHL

		Normal	SNHL
0.5 kHz	Contra	- 0.047	0.267
	Ipsi	0.100	0.397**
1 kHz	Contra	0.104	0.358*
	Ipsi	- 0.072	0.428**
2 kHz	Contra	0.255*	0.369*
	Ipsi	- 0.038	0.299
4 kHz	Contra	0.374**	0.211
	Ipsi	0.127	0.432*

* : p<0.05 ** : p<0.01
 contra : contralateral ARTs
 ipsi : ipsilateral ARTs

Table 5. Regression equations for normal ears

Frequency		Regression equation	p-values
0.5 kHz	Contra	ULL = 112 - 9.83 ART	0.691
	Ipsi	ULL = 79 - 0.26 ART	0.399
1 kHz	Contra	ULL = 85 + 0.20 ART	0.382
	Ipsi	ULL = 119 - 0.17 ART	0.543
2 kHz	Contra	ULL = 56 + 0.48 ART	0.029*
	Ipsi	ULL = 109 - 8.81 ART	0.751
4 kHz	Contra	ULL = 27 + 0.78 ART	0.005**
	Ipsi	ULL = 72 + 0.31 ART	0.365

* : p<0.05 ** : p<0.01

(r = 0.358, p<0.05), 2 kHz
 (r = 0.369, p<0.05), 4 kHz
 kHz (r = 0.432, p<0.05)

가

(Table 4).

회귀 분석

2 kHz
 (t - test, p<0.05), 4 kHz
 (t - test, p<0.01) (Table 5),
 0.5 kHz, 1 kHz
 (t - test, p<0.01) 1 kHz
 , 4 kHz (t - test, p<0.05)
 (Table 5).

Table 6. Regression equations for ears with SNHL

Frequency		Regression equation	p-values
0.5 kHz	Contra	ULL = 64 + 0.32 ART	0.070
	Ipsi	ULL = 27 + 0.75 ART	0.006**
1 kHz	Contra	ULL = 45 + 0.55 ART	0.012*
	Ipsi	ULL = 16 + 0.88 ART	0.002**
2 kHz	Contra	ULL = 63 + 0.38 ART	0.143
	Ipsi	ULL = 39 + 0.60 ART	0.052
4 kHz	Contra	ULL = 56 + 0.46 ART	0.334
	Ipsi	ULL = - 109 + 2.13 ART	0.045*

* : p<0.05 ** : p<0.01

고찰

가

가

가

. Alberti Kristensen
 가

11)

(variability)

(intersubject variability)

(intrasubject variability)

가

가¹²⁾

Dirks Kamm(1976)
 Bornstein Musiek(1993)⁹⁾¹⁰⁾
 가
 가
 7 13 dB
 가
 4 4 dB
 가
 1 kHz 2.6 dB, 2 kHz 2.7 dB
 1 kHz -0.5 dB, 2 kHz -55 dB
 McLeod Greenberg⁷⁾

요약 및 결론

73 50

McLeod Greenberg⁷⁾
 가
 가 1 kHz 0.74, 2 kHz 0.81
 가 Olsen⁵⁾
 0.88 가
 2 kHz, 4 kHz
 McLeod
 가
 가
 t
 2 kHz , 4 kHz
 0.5 kHz , 1 kHz
 , 4 kHz
 Olsen⁸⁾

1) 가
 11 dB
 7 dB
 2) 가
 3 dB
 3) 가
 4) t 2
 kHz
 가

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