

Dental Condition as A Factor Modifying the Transmission of the Sound Vibration in the Skull Bones

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The additional tests with stimulation of the mastoid

We also performed measurements of the amount of energy reaching the cochlea area during stimulation from the mastoid in various dental conditions.

We present the measurements for skull No. 1 shown in the paper. Where, unlike in the case of excitation from the alveolar process, after excitation with mastoid, the morphology of the records in all four dental states is very similar.

In different frequency ranges, depending on the state of dentition, differences in the amount of energy reaching the cochlea area are observed. These differences could be statistically significant. They are differences in excitation from the alveolar process and mastoid, e.g., in the range of 500 to 1000 Hz, the vibration velocity of the skull with a toothless jaw with complete dentures (CD) and frame dentures (FD) is significantly lower than in the skull with reconstructed dentition (RD). In the bands of frequencies from 1001 to 1500 Hz, 3001 to 3500 Hz, and 3501 to 4000 Hz, the skull with reconstructed dentition (RD) has a lower vibration velocity than all other states of the dentition. The same situation was for frequencies from 1501 to 2000 Hz and 2001 to 2500 Hz.

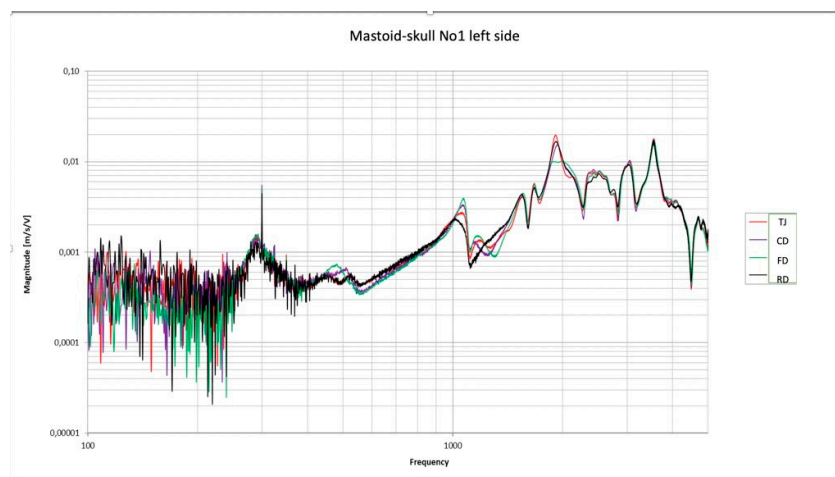


Figure S1. Frequency characteristics of transmittance (vibration velocity in the cochlear area in comparison to exciting the inductor on the mastoid) in different states of dentition for left side.

Table 1. Basic statistics (mean ± SD, median ⟨Q₁; Q₃⟩) of the velocity amplitude from the mastoid process of the skull No. I on the left side in the analyzed dental conditions in selected frequency bands and the result of the multiple comparison test.

FREQUENCY (Hz)	TJ	CD	FD	RD	TJ vs. RD	CD vs. RD	FD vs. RD
500 ÷ 1000	0.29 ± 0.39	0.22 ± 0.25	0.19 ± 0.22	0.33 ± 0.37	SI	<i>P</i> < 0.001	<i>P</i> < 0.001
	0.12	0.12	0.10	0.13			
	⟨0.06; 0.33⟩	⟨0.06; 0.27⟩	⟨0.05; 0.23⟩	⟨0.07; 0.50⟩			
1001 ÷ 1500	1.57 ± 0.61	1.54 ± 0.79	1.70 ± 0.85	1.34 ± 0.61	<i>p</i> < 0,001	<i>p</i> < 0,010	<i>p</i> < 0,001
	1.27	1.28	1.35	1.13			
	⟨1.20; 1.74⟩	⟨0.99; 1.52⟩	⟨1.23; 1.56⟩	⟨0.86; 1.69⟩			
1501 ÷ 2000	3.90 ± 1.37	3.87 ± 1.25	4.01 ± 1.37	3.58 ± 0.95	<i>P</i> < 0.050	<i>P</i> < 0.010	<i>P</i> < 0.001
	3.58	3.70	3.76	3.49			
	⟨2.91; 4.76⟩	⟨3.04; 4.75⟩	⟨2.94; 4.75⟩	⟨2.90; 4.19⟩			
2001 ÷ 2500	3.52 ± 1.29	3.68 ± 1.48	3.44 ± 1.40	3.22 ± 1.09	<i>P</i> < 0.001	<i>P</i> < 0.001	<i>P</i> < 0.050
	3.18	3.08	2.81	3.21			
	⟨2,28; 4,42⟩	⟨2,25; 4,96⟩	⟨2.11; 4.56⟩	⟨2.15; 3.95⟩			
2501 ÷ 3000	4.30 ± 2.44	4.50 ± 2.42	4.49 ± 2.50	4.33 ± 2.54	SI	SI	SI
	4.54	4.75	4.66	4.53			
	⟨2.18; 5.86⟩	⟨2.20; 6.06⟩	⟨2.23; 6.08⟩	⟨1.81; 6.15⟩			
3001 ÷ 3500	1.42 ± 0.68	1.49 ± 0.62	1.62 ± 0.60	1.23 ± 0.47	<i>P</i> < 0.001	<i>P</i> < 0.001	<i>P</i> < 0.001
	1.35	1.35	1.46	1.14			
	⟨0.87; 1.84⟩	⟨1.03; 1.90⟩	⟨1.13; 2.30⟩	⟨0.96; 1.44⟩			
3501 ÷ 4000	1.39 ± 0.36	1.40 ± 0.41	1.30 ± 0.34	1.15 ± 0.38	<i>P</i> < 0.001	<i>P</i> < 0.001	<i>P</i> < 0.001
	1.51	1.60	1.50	1.37			
	⟨1.34; 1.60⟩	⟨1.23; 1.68⟩	⟨0.96; 1.57⟩	⟨0.89; 1.40⟩			
4001 ÷ 4500	0.84 ± 0.37	0.92 ± 0.32	0.90 ± 0.32	0.84 ± 0.34	SI	SI	SI
	0.86	0.92	0.94	1.00			
	⟨0.70; 1.13⟩	⟨0.83; 1.15⟩	⟨0.79; 1.07⟩	⟨0.69; 1.07⟩			
4501 ÷ 5000	0.71 ± 0.40	0.67 ± 0.41	0.65 ± 0.41	0.72 ± 0.41	SI	<i>P</i> < 0.001	<i>P</i> < 0.001
	0.92	0.85	0.83	0.99			
	⟨0.20; 1.04⟩	⟨0.13; 1.04⟩	⟨0.14; 1.02⟩	⟨0.21; 1.05⟩			

SI-Statistically insignificant

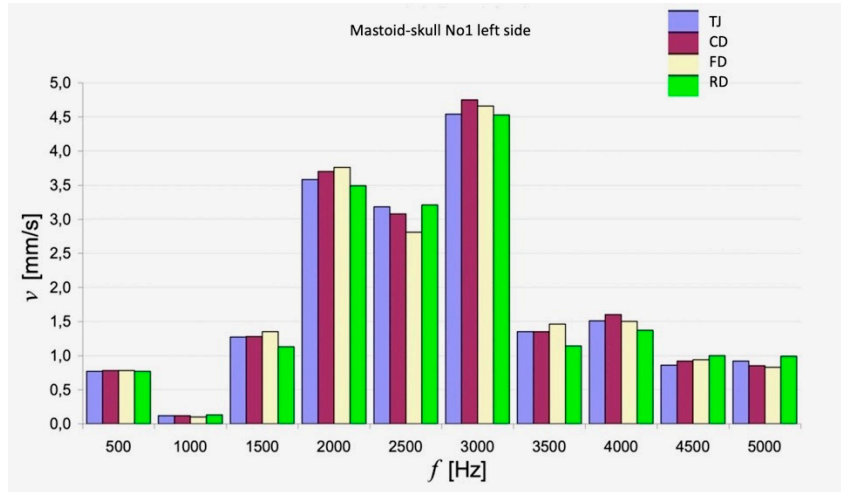
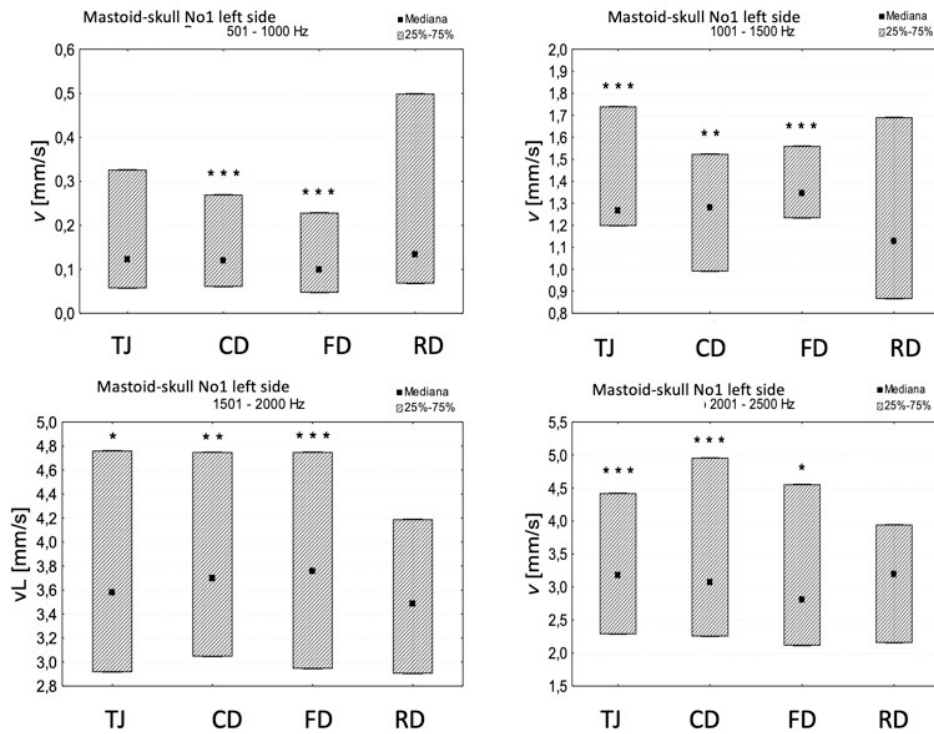


Figure S2. The effective vibration velocity v_{RMS} (mm/s) measured on the left side of skull No1 in the 500 Hz bands. Four states of dentition (column chart).



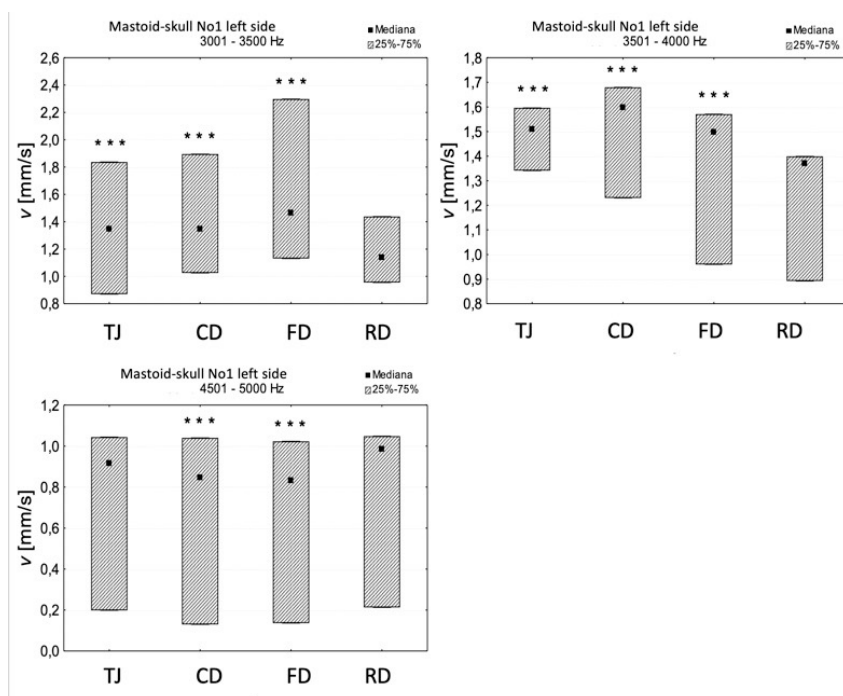


Figure S3. Graphical presentation of the result of the multiple comparison test during mastoid stimulation. Skull No. I on the left side in the analyzed dental conditions in selected frequency bands.



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