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## 3D Palatography

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## 3D MODULE

### Principle

Use of a structured light

→ to determine the shape of the palate

Can be used for various palatography studies

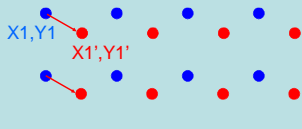
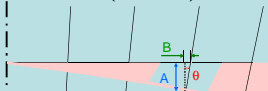
□ STATIC (Direct & Indirect)

□ EPG

To classify locutors (wide, narrow, arched palate)

To get the real surface of the tongue print onto the palate

$$A = B \cdot (\tan \theta)^{-1}$$



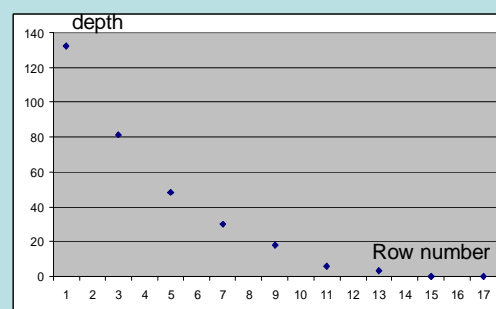
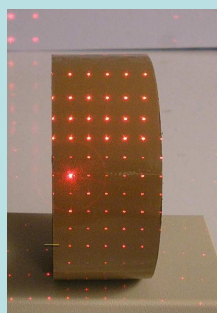
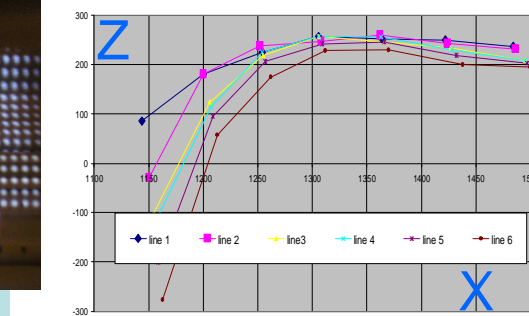
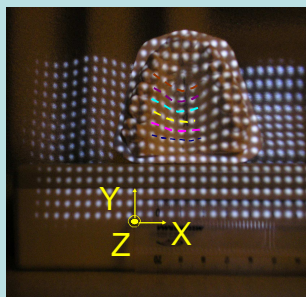
$$X_s \cdot \text{Defx} = X_o$$

$$Y_s \cdot \text{Defy} = Y_o$$

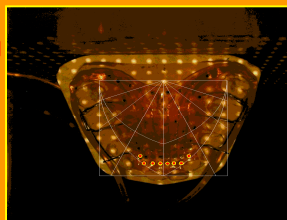
$$\text{Defx} = X_s^{-1} \cdot X_o$$

$$\text{Defy} = Y_s^{-1} \cdot Y_o$$

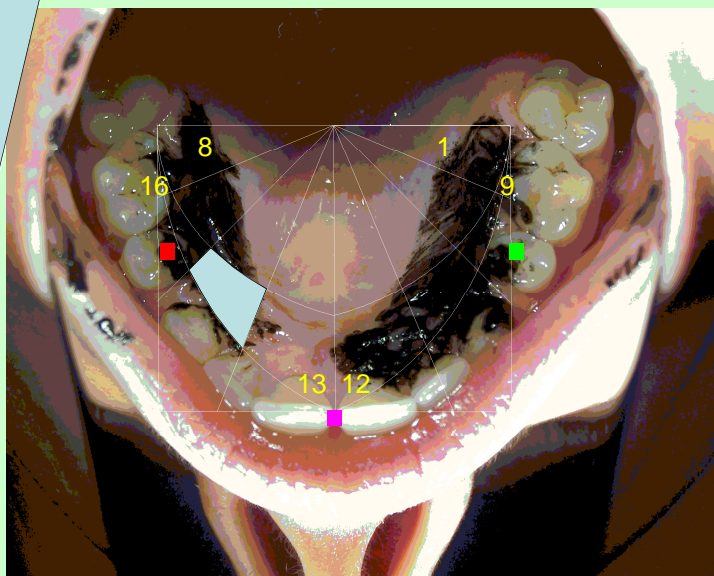
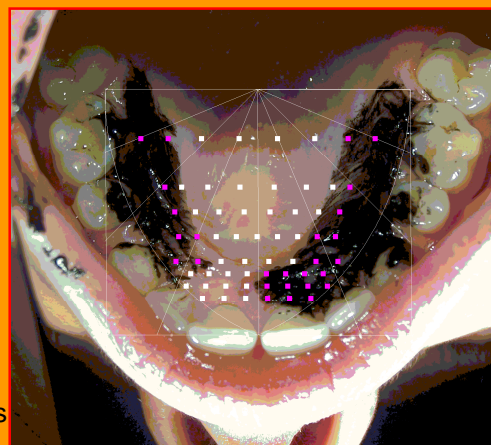
$X_s, Y_s$  structured light matrix (without distortions)  
 $X_o, Y_o$  observed matrix (with distortions)



simEPG



- Characterize the EPG palate
- Get the total surface of the tongue print beyond the digital pattern
- Possible tests of several virtual electrodes layouts



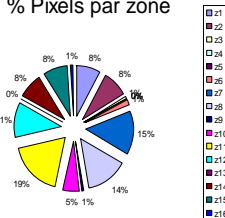
### Tongue Print Characterization

Provides figures out of the palatogram

→ statistic comparisons intra/inter speakers

zone	barycentre_line	barycentre_row
1	-111	424
2	-231	378
3	-382	299
4	0	0
5	0	0
6	-359	-290
7	-246	-249
8	-110	-393
9	-138	492
10	-328	423
11	-486	330
12	-635	156
13	-619	-159
14	-466	-324
15	-341	-425
16	-148	-490

Pixels distribution  
% Pixels par zone



Coefficients de symétrie

LEFT/RIGHT	0,598304379
ANT/POST	0,590841169