HANDS-ON VERSUS LECTURE: HOW TO LEARN THE FUNCTION OF THE MASTICATORY SYSTEM WITH THE ARCUSdigma®

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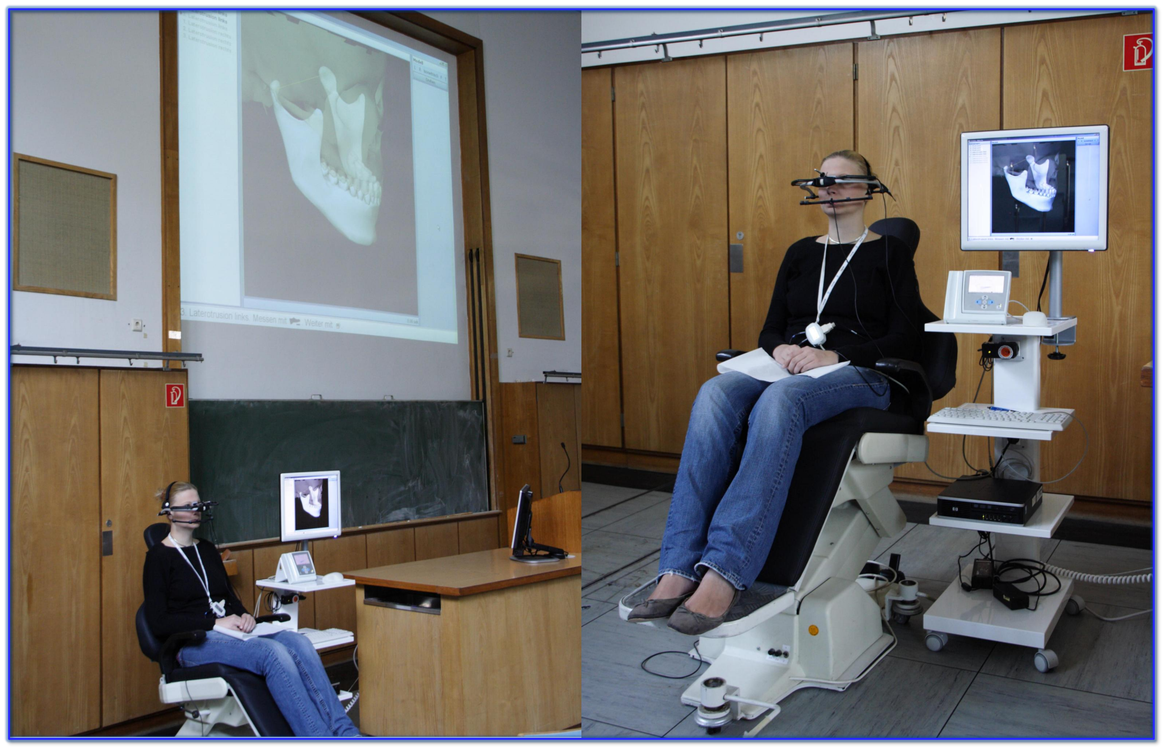
The function of the masticatory system as a 3-dimensional movement of the lower jaw is often very hard to understand for undergraduate students. Even perfect 2-dimensional graphics cannot impart the knowledge of this complex system in a satisfactory descriptive approach. Therefore we introduced the usage of electronic registration systems to our preclinical courses to improve the understanding of complex 3D movements and the influence of anatomical differences on it.

In the course of their preclinical curriculum they where instructed in the topic of “functional movement” with different methods. First the three-dimensional movements were explained only with a power-point presentation with simple drawings (step 1). A few weeks later the same topic was demonstrated by a three-dimensional video (step 2). At least the movements where shown as a live demonstration with an electronic registration system (ARCUSdigma; KaVo Dental GmbH)(step 3). These data were used for programming an ”individuel virtual articulator” (step 4). At the end of the curriculum the students had to fill out a questionnaire including several questions about their rating of the lectures. Two of them are shown in the tables.



Live demonstration with ARCUSdigma

Evolution of didactics:

step 1
Oral presentation and graphics

step 2
3-dimensional video

step 3
Live demonstration with ARCUSdigma and online presentation of recordings

step 3
Live demonstration with ARCUSdigma and online presentation of recordings

step 4
Virtual articulator

For the first question the students could choose as many answers as they wanted. Most of them ticked the boxes „Video“ and „Live Demonstration“ as a combination. In a follow-up discussion nearly every student explained that he only had understood the complexity of the movements in full through the practical demonstration with the ARCUSdigma and the simultaneous online recording in 2D graphs of three aspects and 3D animation while performing the movement. The demonstration of individually animated 3D movements like a virtual articulator in comparison to a mechanical articulator was seen as “very helpfull” to understand the necessity of an individually registration of patients jaw movements.

The use of the measuring equipment was seen significantly helpfull by the students to recognize and understand the physiological movement patterns.

This tendency to require live demonstrations and even more hands-on training in preclinical education is also seen in the second question.

1. From which type of presentation do you have learned most about articulation ?	Oral presentation	Drawings	Video	Live Registration with ARCUSdigma
(Multiple answers are permitted)	10 %	24 %	63 %	39 %

2. Would it be helpfull for you to have clinical hands-on (e.g. impressions, registration) during your preclinical education?	Very helpfull	Helpfull	Not helpfull	No answer / Do not know
(only single answer is permitted)	31 %	59 %	2 %	8 %

Conclusion

As a result, the practical work with an electronic measuring system seems to be superior to a conventional lecture when teaching.

To implement practical demonstrations and hands-on lessons into our curriculum it is very important to use adequate equipment. For demonstrating the individual jaw movement the electronic registration system ARCUSdigma® seems to be superior to other systems.

As an additional benefit when integrated into the curriculum as a hands-on lecture this system can be used at the same time for numerous research on basic questions related to anatomical and functional data.