Remote teaching in a preclinical phantom course in operative dentistry during the COVID-19 pandemic

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Undergraduate dental education

- Teaching of theoretical knowledge
  - Large-group setup (i.e. lectures)
  - Direct interaction between teachers and students
- Training of physical skills
  - Requiring dental simulators or phantom heads
During the COVID-19 pandemic

- Initially, on-site teaching activity was suspended
- Students not present at our dental school
- Development of a new curriculum was required
  - distance education (theoretical knowledge), 11 weeks
  - subsequent on-site education (physical skills), 10 weeks
- Podcasts were recorded; interactions via video meetings
- Measures of physical distancing during subsequent on-site education
Uncertainty regarding distance education

- Distance education was used for the **first time** at our dental school
- No previous experience of both educators and students
- Students’ **acceptance and effectiveness was unknown**
- During the initial phase, future development of the pandemic and feasibility of the concept was still unknown
Aims & objectives

We retrospectively

(1) analysed the acceptance of podcasts as a new teaching format,
(2) analysed the use of podcasts over time,
(3) linked usage data with the results of the final summative examination

within the preclinical course in Operative Dentistry (6th semester of the undergraduate dental curriculum in Germany).
Materials and methods

The new curriculum

- During summer term 2020, n = 33 students were enrolled in the phantom course
- A total of 29 podcasts covering different topics:
  1. Cariology / Restorative Dentistry / Preventive Dentistry,
  2. Endodontology,
  3. Periodontology
- Podcasts were available via a learning management system (3 per week)
- Podcasts could be viewed on-demand and off-campus for an unlimited number of times
Results

Podcast usage

• Average length of podcasts: **22.9 ± 7.7 minutes**

• Average number of podcast viewers: **24 students** (min: 17, max: 29)

• Average number of accesses by podcast viewers: **5.6 times**

• Podcasts in Cariology / Restorative Dentistry / Preventive Dentistry were viewed by more students than the other topics (p=0.047)

• Examination: items in Periodontology showed inferior results compared to the other topics (p<0.001)
Results

Podcast usage over time

11 weeks of distance education
13th April 2020 – 28th June 2020

3 podcasts / week were uploaded between
20th April 2020 – 28th June 2020

10 weeks of on-site education
29th June 2020 – 4th September 2020

MC examination
(7th September 2020)
Discussion

Podcast usage

• Podcasts were shorter than conventional lectures from pre-COVID19
  
  • Students’ attention decreases after only 10 minutes (Hartley and Cameron 1967)

  • Videos in massive open online courses are recommended to last between 6 and 20 minutes (Tolks et al. 2016)

• Almost all students used podcasts → high students’ acceptance
  
  • Only 4 students viewed no podcasts

  • Students viewing podcasts accessed each podcast multiple times
Discussion

Podcast usage

• Podcast accesses showed a linear trend already at the beginning of the term
  • Mostly due to intrinsic motivation
  • Final examination triggered an extrinsic increase
• Results of the final examination comparable to those from pre-COVID-19
  → distance education seems effective
Conclusions

1. Distance education using online podcasts seems to be a **viable way of teaching** theoretical knowledge in undergraduate dentistry.

2. Podcast **usage** seems to be **linked to examination results**.

3. In the future, podcasts should be made available to students in addition to conventional lectures when the regular curriculum can be resumed.