



# Undescended testis? How best to teach the physical examination

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## Summary

### Background

Undescended testis in boys is common. Guidelines recommend surgical treatment between the ages of 6 months and 2 years; nevertheless, orchidopexy is frequently performed at later ages. One reason is the belated diagnosis due to a perceived difficulty in the physical examination (PE) and correct localization of the testis.

### Objectives

We aimed to find an effective method for teaching the physical examination of the testis in a child.

### Study design

An interdisciplinary team developed teaching sessions, including an educational video and a simulator. Medical students ( $n = 133$ ) were randomized into three groups: self-study only, video, and video and simulator. The sessions were carried out and quantitative feedback was collected from the teachers and students. The learning achievements of the different groups were assessed with an objective structured clinical examination (OSCE). The differences in mean OSCE results between all three groups were tested using one-way analysis of variance (ANOVA). For multiple pairwise comparisons, a closed testing procedure was performed using unpaired  $t$ -tests.

### Results

The self-study only group acquired the poorest results in the OSCE, with a mean score of 5.1 out of 10. The

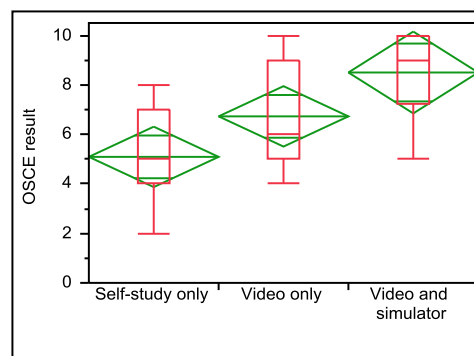
video-only-group reached a mean of 6.7, and the video-and-simulator group performed best with a mean score of 8.5. The differences between all three groups were found to be statistically significant, with  $P = 0.007$ . The attached figure illustrates this data. If analyzed in pairs, this difference was particularly apparent between the groups self-study only vs video and simulator, with  $P = 0.002$ . Qualitative feedback revealed doubtful effectiveness for educational videos, but positive reactions to training on a simulator.

### Discussion

The poor results of the self-study-only group were in accordance with the literature, where textbook learning was found not to increase OSCE results. The effectiveness of video tutorials remains doubtful; studies focusing on this teaching method are divergent and the present students' feedback supports this data. The effective teaching with the simulator has been proven for other skills (i.e. ultrasound skills). The analyzed cohort for this study was small, and the study should be repeated at different institutions and with larger numbers of students to assure generalizability.

### Conclusions

Low-fidelity pediatric simulators with palpable testis are available and are able to improve examining skills in medical students. We hope the presented study inspires medical educators in their teaching of the PE of the pediatric testis.



**Summary Figure** One-way analysis of OSCE results by group.

## Introduction

Undescended testis (UDT) in boys is a common problem; its prevalence is estimated to be 1.1% at 1 year of age [1]. To lower the risks of subfertility and testicular carcinoma, international guidelines recommend surgical treatment between the ages of 6 months and 2 years [2–5]; nevertheless, orchidopexy is frequently performed at later ages [2,3,5]. Low rates of early diagnosis during routine examinations of newborn males or of boys during the first year of life have been discussed as one reason for the delayed treatment [2]. Family and internal medicine as the referring provider have been found to be predictive of delayed surgery [5]. One reason is the perceived difficulty of the physical examination of the testes in pediatric patients [6]. The teaching of this skill seems to be underrepresented in medical education. Numerous senior pediatricians claim that they have never been structurally taught how to correctly examine the testis of a child. The highest-ranked methods for teaching physical examination (PE) in general are demonstrations and practice with standardized patients (SP) or on real patients [7]. However, using pediatric SPs or patient volunteers presents an ethical challenge [8]. In the case of testicular examination, the issue is further complicated because the genitalia is regarded a sensitive area and examination may cause embarrassment. Most medical schools cannot provide pediatric SPs or patients to teach the physical examination of the testis to a large cohort of medical school students.

The present study therefore aimed to find the second best alternative to successfully teach the examination of the testis in a child. This article summarizes the development of the teaching session, teachers' experience, objective structured clinical examination (OSCE) exam results, and students' and teachers' feedback.

## Methods

### Course development and objective structured clinical examination

In an interdisciplinary team of pediatric surgeons and pediatricians, a new teaching session for medical students was created. The process was carried out according to the recommendation of Kern's strategies for curriculum development (needs assessment, goals, strategies, implementation, evaluation) [9]. The perceived need for improvement was verified by reviewing the literature.

A survey confirmed that, at the present institution, no other specialty taught physical examination of the pediatric testis (e.g. the Department of Urology). Goals and learning objectives were defined:

- After the course, the student is able to carry out a correct physical examination of the pediatric testis on a model.
- The right terminology is used when summarizing the findings.
- The student is able to explain why a certain way of carrying out the PE is necessary to avoid mistakes.

Reviewing the literature again, the educational strategies were chosen. It was decided to compare two teaching methods:

- video only: interactive lecture and instructional video
- video and simulator: interactive lecture, instructional video and hands-on training on a simulator.

The new session was embedded into a third year pediatric physical examination course, which is one of many PE courses held in year 3 at the medical school. All of these courses are assessed with a central OSCE exam at the end of the semester.

The pediatric PE course was carried out in five 2-hour sessions on five consecutive days. On days 1–4, students were introduced to pediatric patients and their specific characteristics. They trained on simulators and volunteer patients. Pediatric surgeons conducted the teaching on day 5. After introducing the wide range of pediatric surgery and revising the physical examination of the abdomen, the new session about the testis was carried out. Three different teachers taught the sessions, all of whom had teaching expertise and participated in the design of the session (SZ, MT, AS). In detail, the sessions were carried out as follows: both groups started with an introduction on the importance of physical examination of the pediatric testis, and the learning objectives were handed out. With the help of a slide show, the terminology, physiological findings and possible pathologies were explained. This was followed by a freely available instructional video showing a physician examining a child while explaining and commenting his maneuvers. The video can be found by using the search terms 'examination genitalia pediatrics'. Students were encouraged to ask clarifying questions.

For the first group (video only) the session ended after all questions had been answered. The second group (video and simulator) continued with hands-on training on a simulator. For this, a model of a male baby with palpable testes had been obtained from Erler-Zimmer GmbH & Co. KG (Germany).

To assess the sessions, an OSCE station was developed. The station tested for the learning objectives described above and was carried out on the model. The organization of the central end-of-semester OSCE exam was carried out by the Dean's office. Students were randomized to 17 of 60 possible stations. The newly designed OSCE station on the physical examination of the pediatric testis was integrated into this central exam and made available for students to be randomized to. The OSCE exam was rated by one of the authors (SZ). She has a postgraduate degree in medical education, 6 years of experience as an OSCE rater and underwent regular rater training. The instruction for the OSCE included information about the patient and about the required task; no details about how the task should be performed were supplied. Instructions were read to the participants, and an additional printed instruction sheet was available for the participants. The maximal rating score was 10; rating was differentiated by the criteria inspection, cremasteric reflex, and simultaneous closure of the inguinal channel with one hand and palpation of the testis with the other hand, carried out on both sides. Detailed rating scores are lined out in [Table 1](#).

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