A Novel Simulation-Based Training Program to Improve Clinical Teaching and Mentoring Skills

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ABSTRACT: **Background:** Physicians are often insufficiently trained in bedside teaching and mentoring skills.

Objectives: To develop, implement and assess a simulation-based training program designed to improve clinical teaching among physicians.

Methods: We developed a one-day tutor training program based on six simulated scenarios with video-based debriefing. The program's efficacy was assessed using questionnaires completed by the participating physicians and their students. Main outcome measures were self-perceived teaching skills at baseline, after participation in the program, and following completion of the tutor role. Secondary outcome measures were the students' perceptions regarding their tutor skills.

Results: Thirty-two physicians (mean age 35.5 years, 56% females) participated in the program. Self-assessment questionnaires indicated statistically significant improvement following the program in 13 of 20 measures of teaching skills. Additional improvement was observed upon completion of the tutor role, leading to significant improvement in 19 of the 20 measures. Questionnaires completed by their students indicated higher scores in all parameters as compared to a matched control group of tutors who did not participate in the program, though not statistically significant. Most participants stated that the program enhanced their teaching skills (88%), they implement program-acquired skills when teaching students (79%), and they would recommend it to their peers (100%). Satisfaction was similar among participants with and without previous teaching experience.

Conclusions: A novel one-day simulation-based tutor training program was developed and implemented with encouraging results regarding its potential to improve clinical teaching and mentoring skills.

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For centuries it was assumed that faculty members were naturally effective teachers, merely by virtue of their clinical or scientific expertise [1,2]. It became clear, however, that effective clinical teaching is not only about medical knowledge but also requires mentoring and teaching skills, necessitating faculty training [2]. Various faculty development programs were subsequently devised in different universities worldwide, influenced by contemporary trends and theories on medical education [2,3]. Additional reforms in medical education are needed to keep pace with the changing health care environment of the 21st century as well as to improve patient safety and educational accountability [4,5].

Simulation-based medical education is a rapidly growing field, enabling trainees to gain practical experience and learn from their mistakes in a risk-free environment for their patients [6,8]. Video recording is often used in these settings to facilitate effective debriefing [6]. Simulation-based learning frequently employs standardized patients, i.e., actors trained to simulate patients in a standardized manner for teaching or assessment purposes [9,10]. Similarly, standardized students (i.e., actors simulating medical students) can be used to improve teaching capabilities of the academic staff [11,12] and to assess the efficacy of faculty development programs [13-15]. Despite the potential of simulation-based programs to effectively train tutors of medical students by using standardized patients and students coupled with video recording and debriefing, there are only a few reports in the literature exploring that domain [11,12], usually with partial and qualitative outcome evaluation.

In light of the growing awareness of the need to improve faculty preparedness to carry out their clinical mentorship roles, an innovative simulation-based training program with video-based debriefing was developed, implemented and assessed. This paper describes the experience and lessons learned from the perspective of the participating faculty and the impact of the program on their perceived bedside teaching and mentoring skills.

MATERIALS AND METHODS

The study was conducted at the Israel Center for Medical Simulation at the Sheba Medical Center, Israel [6]. The study was approved by the hospital's institutional review board, and all the participants signed a written informed consent form.

PROGRAM DEVELOPMENT

First, a needs assessment was conducted among 34 randomly selected physicians from Sheba Medical Center, using a designated questionnaire. Next, a one-day tutor-training workshop was constructed, consisting of six simulated scenarios (such as bedside teaching to a patient reluctant to cooperate and anxious about his or her disease, dealing with an ethical dilemma presented by a student, etc.) selected in accordance with the aforementioned needs assessment to represent a wide array of teaching challenges relevant to tutors. The scenarios were developed by A.U. and A.Z. with the aid of the MSR professional staff, including education and simulation experts, and in light of the medical and educational literature. For example, the bedside teaching scenario and the educational challenges arising from it are based on several articles on this subject [16,17].

In each scenario either a standardized student or a standardized patient was employed, portrayed by professional actors trained by the MSR professional staff. The scenarios included detailed characteristics of the standardized patient (an actor who role plays in a standardized manner according to the characteristics provided him in advance). These include name, gender, age, social and clinical background, and personality characterization, as well as a detailed description of the scenario and specific instructions for the actor on how to react to various situations that may develop during the scenario, according to the participant's response.

PROGRAM IMPLEMENTATION

Eligible participants were physicians from Sheba chosen to serve as clinical tutors during the study period, regardless of their prior teaching experience. Included were only tutors leading a clerkship of at least one month duration (i.e., internal medicine, general surgery, pediatrics, obstetrics and gynecology, psychiatry, and neurology clerkships). A total of four workshops were conducted during a one-year period (May 2010 to May 2011), with a maximum of 10 participants per workshop. All scenarios were recorded by the MSR audiovisual system for the purpose of an effective video-based feedback group session led by the workshop's instructor. All four workshops were guided by a single instructor (O.T.), a pediatrician with extensive experience in teaching medical students, who was trained as a simulation-based instructor by MSR and had previous experience as an instructor in other simulation-based workshops at MSR. One of the authors (A.U.) participated as a supervising observer in all four workshops.

WORKSHOP STRUCTURE

Each workshop began with an explanation of the project's rationale and goals, followed by a short (15 minutes) structured lecture on bedside teaching. After the lecture, participants entered the simulation rooms to experience the first three scenarios, followed by video-based debriefing of these scenarios led by the instructor. Afterwards, participants experienced three additional scenarios, followed again by video-based debriefing. The workshop was concluded by a summary and feedback discussion. The total duration of each workshop was approximately 7 hours.

At the beginning of each workshop, participants were randomly divided into three groups, each with two to four participants. In each scenario, one of the participants portrayed the tutor while the others were instructed to act as medical students (scenarios 1–3) or were asked to observe the scenario through a one-way window (scenarios 4–6). A professional actor in each scenario portrayed either a standardized patient (scenarios 1 and 3) or a standardized medical student (scenarios 2, 4, 5 and 6). The duration of each scenario was 10 minutes. Eventually, each participant acted as a tutor in one to two scenarios and was a student or observer in three to four others. All participants attended the video-based debriefings where selected parts of each scenario were reviewed on a screen and then discussed by the forum under the instructor's guidance.

PROGRAM ASSESSMENT

At the beginning of the workshop, participants were asked to complete a self-evaluation questionnaire, assessing their perceived ability in certain skills and their degree of confidence to deal with situations relevant to tutors. At the end of the workshop, a similar questionnaire was completed by the participants in order to examine the self-perceived change following the intervention. A third similar questionnaire was completed 3–4 months following the workshop, after the participants had actively served as tutors of medical students in their respective departments. At the second and third questionnaires, participants were additionally asked to assess the contribution of the workshop to their tutoring skills and if they would recommend it to their colleagues. At the third questionnaire participants were also asked to what extent they have implemented skills learned at the workshop in their work as tutors. Another questionnaire on satisfaction from logistic and methodological aspects of the workshop was completed by participants at the end of each workshop.

In order to conduct a thorough and objective evaluation of the workshop's efficacy, an attempt was made to assess the students' perception of their tutors' skills using a satisfaction questionnaire that is routinely completed by Sheba students at the end of each clinical clerkship. Questionnaires of students who were taught by the participating tutors were compared to those taught by a control group of tutors who did not participate in the program. The students were unaware of the study when filling out these routine questionnaires. The control group of tutors was pre-selected at a 1:1 ratio to be matched to the study

MSR = Israel Center for Medical Simulation

group for gender, professional status, experience in teaching students, and teaching department. The questionnaires were based on a 1–4 scale to assess outcomes, unless otherwise stated. The specific scales for the various questionnaires are provided in the legends of the relevant tables throughout the article.

STATISTICAL ANALYSIS

Descriptive statistics were used to illustrate the distribution of baseline characteristics of the tutors, as well as to describe the results of the various questionnaires. In order to compare baseline characteristics between the study and control groups the chi-square test for categorical variables was used. Student's *t*-test was used to compare participants' questionnaire scores before and after the intervention and to compare the results of students' evaluations between the study and control groups. All *P* values were two-sided, and *P* values < 0.05 were considered to indicate statistical significance.

RESULTS

NEEDS ASSESSMENT

Thirty-four randomly selected physicians (mean age 40.2 ± 9.9 years, mean experience as physicians 13.2 ± 10.4 years, 62% males) participated in the preliminary needs assessment. They included 5 department heads, 14 senior physicians and 15 residents. Thirteen had no previous experience in mentoring medical students, 9 had little experience and 12 had substantial experience (i.e., mentored at least three groups of students). Eighteen (53%) worked in internal medicine departments, and the rest in various surgical or non-surgical departments.

Participants were asked to assess the importance of 10 teaching and mentoring skills for tutors. These skills included leadership, role modeling, communication skills, lecturing in front of a class, interactive teaching in a small group, bedside teaching, providing constructive comments to a student in front of the group, giving personal feedback, setting limits, and teaching medical ethics. Each of these 10 skills was marked as moderately or highly important by most participants (94%–100% depending on the specific skill). Therefore, an attempt was made to incorporate each of these 10 skills into the program, whether directly or indirectly. Next, participants were asked to what extent they agree to a set of statements designed to assess their opinions regarding the need for a tutor-training program and its feasibility. Most participants (76%) did not agree with the statement that a good clinician is necessarily a good mentor for medical students, and only 32% thought that the current training for tutors is sufficient. Most participants agreed it is important (97%) and feasible (100%) to improve clinical teaching skills by designated programs, and 88% expressed their willingness to participate in a tutor-training program. There was no significant difference between experienced (n=21) and non-experienced (n=13) physicians.

PARTICIPANTS

Thirty-two physicians (mean age 35.5 ± 4.7 years, 56% females) participated in the tutor-training program, of whom 9 came from internal medicine departments, 8 from pediatrics, 5 from obstetrics and gynecology, 4 from psychiatry, 3 from surgery, and 3 from neurology. Of the 32 participants 22 were residents (69%) and 19 had no prior experience as tutors (59%).

PROGRAM ASSESSMENT

The results of the satisfaction questionnaires filled out at the end of the workshop are depicted in Table 1. Participants were asked to grade the six simulated scenarios according to their relevancy to the tutor's role and state their level of satisfaction on various aspects of the workshop. The majority of participants graded all six scenarios as highly or moderately relevant (grade 3 or 4 on a 1–4 scale). All participants stated a high or moderate level of satisfaction (grade 3–4) regarding the various methodological and logistic aspects of the workshop [Table 1].

Table 2 describes the results of the self-evaluation questionnaire assessing participants' perceived ability in certain skills and their degree of confidence to deal with situations relevant to tutors, both at the beginning and at the end of the workshop. As shown in this table, when comparing the average scores before and after the workshop, some increase occurred in all 20 parameters examined. In 13 of these parameters the improvement reached statistical significance.

Table 1. Relevance of the simulative scenarios and participants' satisfaction

	Mean score (SD)[a]	% scores 3-4[b]
Scenario relevance to tutors[c]		
1. Bedside teaching	0.92 (3.50)	84%
2. Feedback to a student presenting a patient	3.69(0.64)	91%
3. Dealing with an angry patient	3.59 (0.56)	97%
4. Dealing with an ethical dilemma	3.69 (0.47)	100%
5. Dealing with a student who is often late or absent	3.59 (0.61)	94%
6. Feedback to a misbehaved student	3.75 (0.44)	100%
Participants' satisfaction		
SP and SS contribution to the efficacy of the program	3.66 (0.48)	100%
SP and SS portrayal in a convincing and authentic manner	3.88 (0.34)	100%
Contribution of the video-based debriefing to the efficacy of the program	3.91 (0.30)	100%
Satisfaction with the program's instructor	3.91 (0.30)	100%
Satisfaction with the logistic and administrative organization of the program	3.97 (0.18)	100%

[a]Questionnaire scores are on a 1–4 scale: 4 = high, 3 = moderate, 2 = slightly, 1 = not at all

[b]Percentage of participants who gave a rating of 3 (moderately) or 4 (highly)

[c]The program's six simulative scenarios, as depicted in Table 1

SP = simulated patients, SS = simulated students

Table 2. Results of the self-evaluation questionnaires assessing participants' abilities and confidence before and after the workshop (n=32)

	Mean score (SD)[a]			
	Pre-workshop	Post-workshop	Delta	*P* value[b]
Assessment of personal ability in:				
Leadership	2.94 (0.72)	3.22 (0.71)	0.28	**0.005**
Role modeling	3.28 (0.58)	3.53 (0.57)	0.25	**0.02**
Communication skills	3.53 (0.51)	3.63 (0.55)	0.10	0.37
Lecturing in front of a class	3.03 (0.90)	3.22 (0.71)	0.19	0.08
Interactive teaching in small groups	3.25 (0.62)	3.28 (0.73)	0.03	0.74
Bedside teaching	3.06 (0.72)	3.25 (0.67)	0.19	0.06
Providing constructive comments to a student presenting a case in front of a group	3.13 (0.75)	3.25 (0.57)	0.12	0.29
Giving personal feedback to students	3.03 (0.74)	3.31 (0.74)	0.28	0.06
Setting limits and handling students who misbehave	2.47 (0.72)	2.78 (0.83)	0.31	**0.04**
Teaching medical ethics	2.72 (0.73)	3.16 (0.77)	0.44	**0.001**
Assessment of confidence to deal with the following situations:				
Getting patients' consent and cooperation to be examined by students	3.25 (0.72)	3.56 (0.72)	0.31	**0.048**
Bedside teaching	2.78 (0.66)	3.22 (0.71)	0.44	**0.001**
Clinical discussion with a group of students	2.94 (0.72)	3.19 (0.74)	0.25	**0.02**
Dealing with an aggressive and problematic patient in the presence of students	2.66 (0.90)	3.06 (0.80)	0.40	**0.001**
Dealing with an ethical dilemma presented by students	2.84 (0.72)	3.22 (0.83)	0.38	**0.01**
Dealing with a student's question when you don't know the answer	2.56 (0.72)	3.16 (0.63)	0.60	**< 0.001**
Loss of students' attention	2.81 (0.69)	3.06 (0.91)	0.25	**0.04**
Encouraging shy students to participate	2.66 (0.87)	3.09 (0.93)	0.43	**0.004**
Dealing with student misconduct	2.22 (0.75)	2.69 (0.82)	0.47	**0.004**
Dealing with students' personal problems	3.16 (0.77)	3.25 (0.84)	0.09	0.41

[a]Questionnaire scores are on a 1–4 scale: 4 = high, 3 = moderate, 2 = low, 1 = not at all
[b]Statistically significant *P* values are marked with bold

RE-EVALUATION FOLLOWING TUTORSHIP

Twenty-eight of the 32 participants completed the actual role of tutors during the time-frame of the study. These 28 tutors completed an additional questionnaire at the end of the clerkship (3–6 months after participating in the workshop). Table 3 shows the results of this post-tutorship questionnaire in comparison to the two earlier questionnaires that were filled out before and right after the workshop. The average score in 13 of the 20 studied parameters increased significantly immediately after the workshop. Another significant increase occurred in 4 of the 20 parameters following the tutorship. Eventually the post-tutorship scores were significantly higher than the pre-workshop scores in 19 of 20 parameters.

OVERALL SATISFACTION

Of the 32 participants, 28 (88%) stated that the workshop contributed highly or moderately to their tutor skills and all 32 (100%) said they would recommend it to their peers. These figures remained relatively unchanged when assessed after 3–4 months among the 28 participants who went on to serve as tutors (79% and 93% respectively). Of these 28 tutors 22 stated that they implement skills learned at the workshop while tutoring students (79%).

STUDENTS' EVALUATIONS

Evaluation questionnaires filled out by the students of the aforementioned 28 tutors were compared to those of a matched control group of 28 tutors who did not participate in the program. The tutors in the study group were rated by 162 students (average 5.8 students per tutor, range 3–13), compared to 186 students in the control group (average 6.6, range 3–15). The 28 tutors who participated in the program scored higher than the ones in the control group in all of the five assessed questions, though not to a statistically significant level [Table 4]. Of note is a trend towards statistical significance in the 5th question, regarding the quality of feedback given by tutors to the students.

DISCUSSION

The importance of training teachers of medical students is widely accepted in the medical education literature [1-3], and was also strongly supported by the results of the preliminary needs assessment conducted for this study. The simulation-based platform was chosen since it is considered to be educationally effective [18] and in light of the MSR's vast experience with its implementation. The format of a relatively short one-day workshop was chosen since it minimized the

Table 3. Trends in self-assessment questionnaire scores before the workshop, afterwards, and following tutorship (n=28)

	Mean score[a]			Post1[b] vs. Pre[b]		Post2[b] vs. Post1[b]		Post2[b] vs. Pre[b]	
	Pre[b]	Post1[b]	Post2[b]	Trend[c]	*P* value[d]	Trend[c]	*P* value[d]	Trend[c]	*P* value[d]
Assessment of personal ability in:									
Leadership	3.04	3.29	3.36	↑	**0.02**	NS	0.54	↑	**0.02**
Role modeling	3.29	3.57	3.64	↑	**0.01**	NS	0.54	↑	**0.01**
Communication skills	3.54	3.68	3.75	NS	0.21	NS	0.42	NS	0.14
Lecturing in front of a class	3.07	3.29	3.50	NS	0.08	NS	0.06	↑	**0.005**
Interactive teaching in small groups	3.25	3.29	3.71	NS	0.71	↑	0.001	↑	**< 0.001**
Bedside teaching	3.00	3.25	3.50	↑	**0.02**	NS	0.05	↑	**< 0.001**
Providing constructive comments to a student presenting a case in front of a group	3.07	3.25	3.61	NS	0.13	↑	0.01	↑	**< 0.001**
Giving personal feedback to students	3.00	3.36	3.36	↑	**0.02**	NS	1.00	↑	**0.048**
Setting limits and handling students who misbehave	2.43	2.82	2.89	↑	**0.01**	NS	0.57	↑	**0.001**
Teaching medical ethics	2.71	3.21	3.46	↑	**0.001**	NS	0.20	↑	**< 0.001**
Assessment of confidence to deal with the following situations:									
Getting patients' consent and cooperation to be examined by students	3.36	3.57	3.75	NS	0.14	NS	0.17	↑	**0.001**
Bedside teaching	2.82	3.21	3.46	↑	**0.003**	NS	0.09	↑	**< 0.001**
Clinical discussion with a group of students	2.93	3.25	3.39	↑	**0.001**	NS	0.29	↑	**0.001**
Dealing with an aggressive and problematic patient in the presence of students	2.68	3.11	3.43	↑	**0.001**	↑	**0.047**	↑	**< 0.001**
Dealing with an ethical dilemma presented by students	2.82	3.29	3.46	↑	**0.004**	NS	0.23	↑	**0.001**
Dealing with a student's question when you don't know the answer	2.61	3.21	3.14	↑	**< 0.001**	NS	0.54	↑	**< 0.001**
Loss of students' attention	2.86	3.07	3.25	NS	0.11	NS	0.13	↑	**0.003**
Encouraging shy students to participate	2.68	3.11	3.14	↑	**0.01**	NS	0.81	↑	**0.01**
Dealing with student misconduct	2.29	2.75	2.75	↑	**0.001**	NS	1.00	↑	**0.001**
Dealing with students' personal problems	3.18	3.29	3.61	NS	0.42	↑	**0.01**	↑	**0.003**

[a]Questionnaire scores are on a 1–4 scale: 4 = high, 3 = moderate, 2 = low, 1 = not at all

[b]Questionnaire filling time: Pre = before workshop, Post1 = after workshop, Post 2 = after tutorship

[c]Trends: ↑ = statistically significant increase, NS= non-significant change

[d]Statistically significant *P* values are marked with bold

disruption of physicians' work, thus facilitating their maximal participation in the program. In order to optimize learning in this relatively short time-frame, an emphasis was placed on active learning techniques known to be more effective than frontal lectures [19]. This was reflected by the active participation in the simulated scenarios and the group discussions during the video-based debriefings.

Table 4. Students' perception of their tutors' skills: comparison between study group and matched control group of tutors

	Mean score[a]			
	Study (n=28)	Control (n=28)	Delta	*P* value
Ability of the tutor to teach in an interactive and interesting manner	3.64	3.58	0.06	0.65
Capability of the tutor to convey clinical skills	3.65	3.48	0.17	0.24
Availability and patience of the tutor	3.80	3.65	0.15	0.19
Ability of the tutor to encourage additional reading	3.65	3.54	0.11	0.41
Level of feedback given by the tutor (1–5 scale)[a]	4.20	3.88	0.32	0.08

[a]Scores are on a 1–4 scale for the first 4 questions (4 = high, 3 = moderate, 2 = low, 1 = not at all) and on a 1–5 scale for the 5th question (5 = very high, 4 = high, 3 = medium, 2 = low, 1 = very low)

During the study design, the intent was to include mainly residents without prior tutor experience, assuming that in this group of participants the intervention will be most efficacious. However, during the study it became clear that a large portion of the physicians who were appointed tutors and sent to the workshop by their department heads were senior physicians (31%) and/or had prior tutor experience (41%). In the summary session, many of the inexperienced tutors noted the important contribution of the more experienced tutors to the effectiveness of the group discussions. Moreover, 85% of the experienced tutors stated that the workshop contributed highly or moderately to their tutor skills and 100% stated that they would recommend it to their peers. These high satisfaction rates are similar to those obtained from the inexperi-

enced tutors (89% and 100% respectively), demonstrating that the program is appropriate for experienced tutors as well.

In order to provide a complete assessment of the program's efficacy, the Kirkpatrick model for evaluating educational outcomes was applied [20]. This model describes four levels of outcomes (reaction, learning, behavior, results) that together provide a comprehensive evaluation of educational programs [3]. A modified version of this model, specifically adapted for medical faculty development programs, was utilized [3].

An attempt was made to assess all four levels according to Kirkpatrick. Level 1 (reaction) was assessed by a satisfaction questionnaire at the end of the workshop. Level 2 (learning) was examined by self-assessment questionnaires at the beginning and the end of the workshop as well as upon completion of the tutor's role. Level 3 (behavior) was assessed after the participants served as tutors, with 77% of them stating that they implemented skills learned at the workshop while tutoring students.

All in all, the assessment of levels 1–3 yielded results that support the efficacy of the program. The results of participants' self-assessment questionnaires before and right after the workshop indicate statistically significant self-perceived improvement in 13 of 20 measures tested. It is reasonable to assume that this improvement is directly related to the intervention. For some measures, additional improvement was observed 3–4 months after the workshop (upon completion of the tutor role), eventually leading to statistical significance in 19 of the 20 measures. There are several possible explanations for this late additional improvement. First, it is well accepted that a part of the skill-learning process does not occur immediately but rather after a latent phase, lasting a minimum of 8 hours, with a significant improvement occurring overnight [21-23]. Another possible explanation is that certain skills taught in the workshop required active implementation in order to complete the learning process and create a sense of competence and confidence. However, one cannot exclude the possibility that some of these late improvements were due to gained tutor experience rather than to the intervention itself.

Assessment of Kirkpatrick's level 4 (improvement among the participants' students as a direct result of the educational intervention) is the most challenging. A systematic review of faculty development programs concluded that most did not perform a complete evaluation of all four levels, especially level 4 which is considered the most difficult to assess [3]. An attempt was made to assess level 4 by analyzing questionnaires that are routinely completed by Sheba students at the end of each clerkship. The students were unaware of the study while filling out these routine questionnaires, enabling a truly objective assessment of level 4 according to Kirkpatrick. In all five assessed parameters, the students rated the 28 participating tutors higher, though not statistically significant, in comparison to a matched control group of 28 tutors who did not participate in the program. Of note is a trend towards statistical significance (0.08) with regard to the quality of feedback given to students by the tutors, which was indeed one of the main skills taught during the workshop.

There are several possible explanations why the higher scores in participants' students' questionnaires did not reach statistical significance. First, the sample size may have been too small to establish significance in the assessed parameters. Second, in contrast to the participants' self-assessment questionnaires, the students' questionnaires were not specifically designed for the program, and most questions (except for the one about feedback) did not directly relate to core subjects taught at the workshop.

CONCLUSIONS

The results of this study support the efficacy of this novel simulation-based program in training tutors of medical students, including those with teaching experience. The short one-day format and the simulation-based platform of this program are two major advantages for reasons discussed above. Future research directions should be increasing the sample size and using custom designed students' questionnaires to further assess the effect of this intervention upon the target population of medical students.

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References

1. Benor DE. Faculty development, teacher training and teacher accreditation in medical education: twenty years from now. *Med Teach* 2000; 22: 503-12.
2. McLean M, Cilliers F, Van Wyk JM. Faculty development: yesterday, today and tomorrow. *Med Teach* 2008; 30: 555-84.
3. Steinert Y, Mann K, Centeno A, et al. A systematic review of faculty development initiatives designed to improve teaching effectiveness in medical education: BEME Guide No. 8. *Med Teach* 2006; 28: 497-526.
4. Cooke M, Irby DM, Sullivan W, Ludmerer KM. American medical education 100 years after the Flexner report. *N Engl J Med* 2006; 355: 1339-44.
5. Pascoe JM, Babbott D, Pye KL, Rabinowitz HK, Veit KJ, Wood DL. The UME-21 project: connecting medical education and medical practice. *Fam Med* 2004; 36 (Suppl): S12-14.
6. Ziv A, Erez D, Munz Y, et al. The Israel Center for Medical Simulation: a paradigm for cultural change in medical education. *Acad Med* 2006; 81: 1091-7.
7. Ziv A, Wolpe PR, Small SD, Glick S. Simulation-based medical education: an ethical imperative. *Acad Med* 2003; 78: 783-8.
8. Farfel A, Hardoff D, Afek A, Ziv A. Effect of a simulated patient-based educational program on the quality of medical encounters at military recruitment centers. *IMAJ* 2010; 12: 455-9.
9. Barrows HS. An overview of the uses of standardized patients for teaching and evaluating clinical skills. AAMC. *Acad Med* 1993; 68: 443-51; discussion 51-3.
10. Stillman PL, Regan MB, Philbin M, Haley HL. Results of a survey on the use of standardized patients to teach and evaluate clinical skills. *Acad Med* 1990; 65: 288-92.

11. Gelula MH, Yudkowsky R. Using standardised students in faculty development workshops to improve clinical teaching skills. *Med Educ* 2003; 37: 621-9.
12. Wilkes MS, Hoffman JR, Usatine R, Baillie S. An innovative program to augment community preceptors' practice and teaching skills. *Acad Med* 2006; 81: 332-41.
13. Prislin MD, Fitzpatrick C, Giglio M, Lie D, Radecki S. Initial experience with a multi-station objective structured teaching skills evaluation. *Acad Med* 1998; 73: 1116-18.
14. Stone S, Mazor K, Devaney-O'Neil S, et al. Development and implementation of an objective structured teaching exercise (OSTE) to evaluate improvement in feedback skills following a faculty development workshop. *Teach Learn Med* 2003; 15: 7-13.
15. Zabar S, Hanley K, Stevens DL, et al. Measuring the competence of residents as teachers. *J Gen Intern Med* 2004; 19: 530-3.
16. LaCombe MA. On bedside teaching. *Ann Intern Med* 1997; 126: 217-20.
17. Ramani S. Twelve tips to improve bedside teaching. *Med Teach* 2003; 25: 112-15.
18. Issenberg SB, McGaghie WC, Petrusa ER, Lee Gordon D, Scalese RJ. Features and uses of high-fidelity medical simulations that lead to effective learning: a BEME systematic review. *Med Teach* 2005; 27: 10-28.
19. Handelsman J, Ebert-May D, Beichner R, et al. Education. Scientific teaching. *Science* 2004; 304: 521-2.
20. Kirkpatrick DL. Evaluating Training Programs: The Four Levels. San Francisco, CA: Berrett-Koehler Publishers, 1994.
21. Karni A, Meyer G, Rey-Hipolito C, et al. The acquisition of skilled motor performance: fast and slow experience-driven changes in primary motor cortex. *Proc Natl Acad Sci USA* 1998; 95: 861-8.
22. Karni A, Sagi D. The time course of learning a visual skill. *Nature* 1993; 365: 250-2.
23. Karni A, Tanne D, Rubenstein BS, Askenasy JJ, Sagi D. Dependence on REM sleep of overnight improvement of a perceptual skill. *Science* 1994; 265: 679-82.

Capsule

Voice-sensitive regions in the dog and human brain are revealed by comparative fMRI

During the approximately 18–32 thousand years of domestication, dogs and humans have shared a similar social environment. Dog and human vocalizations are thus familiar and relevant to both species, although they belong to evolutionarily distant taxa, as their lineages split approximately 90–100 million years ago. In this first comparative neuroimaging study of a non-primate and a primate species, Andics and team made use of this special combination of shared environment and evolutionary distance. The authors presented dogs and humans with the same set of vocal and non-vocal stimuli to search for functionally analogous voice-sensitive cortical regions. They demonstrate that voice areas exist in dogs and that they show a similar pattern to anterior temporal voice areas in humans. These findings also reveal that sensitivity to vocal emotional valence cues engages similarly located non-primary auditory regions in dogs and humans. Although parallel evolution cannot be excluded, their findings suggest that voice areas may have a more ancient evolutionary origin than previously known.

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Eitan Israeli

Capsule

FoxA1 directs the lineage and immunosuppressive properties of a novel regulatory T cell population in EAE and MS

The defective generation or function of regulatory T (T_{reg}) cells in autoimmune disease contributes to chronic inflammation and tissue injury. Liu and co-authors report the identification of FoxA1 as a transcription factor in T cells that, after ectopic expression, confers suppressive properties in a newly identified T_{reg} cell population, herein called FoxA1$^+$ T_{reg} cells. FoxA1 bound to the *Pdl1* promoter, inducing programmed cell death ligand 1 (Pd-l1) expression, which was essential for the FoxA1$^+$ T_{reg} cells to kill activated T cells. FoxA1$^+$ T_{reg} cells develop primarily in the central nervous system in response to autoimmune inflammation, have a distinct transcriptional profile and are CD4$^+$FoxA1$^+$CD47$^+$CD69$^+$PD-L1^{hi}FoxP3$^-$. Adoptive transfer of stable FoxA1$^+$ T_{reg} cells inhibited experimental autoimmune encephalomyelitis in a FoxA1- and Pd-l1- dependent manner. The development of FoxA1$^+$ T_{reg} cells is induced by interferon-β (IFN-β) and requires T cell-intrinsic IFN-α/β receptor (Ifnar) signaling, as the frequency of FoxA1$^+$ T_{reg} cells was reduced in *Ifnb*$^{-/-}$ and *Ifnar*$^{-/-}$ mice. In individuals with relapsing-remitting multiple sclerosis, clinical response to treatment with IFN-β was associated with an increased frequency of suppressive FoxA1$^+$ T_{reg} cells in the blood. These findings suggest that FoxA1 is a lineage-specification factor that is induced by IFN-β and supports the differentiation and suppressive function of FoxA1$^+$ T_{reg} cells.

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Eitan Israeli

"It is better to die on your feet than to live on your knees"

Emiliano Zappata (1879-1919), leading figure in the Mexican Revolution

"Millions long for immortality but do not know what to do with themselves on a rainy Sunday afternoon"

Susan Ertz (1894-1985), British novelist