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Essay

New Educational Programs for Orthoptic Students

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Abstract

Recently, the Japanese educational system has rapidly become more flexible. Legal regulations on educational curriculums for the medical professions have been amended. The Ministry of Health and Welfare has announced that it will amend the controls on the designation of training schools for orthoptists (ORT) in the near future. Educational curriculums provide valuable direction to each medical profession and should have contents which meet contemporary needs. To survive, present day medical profession training schools must create original educational and training courses that are attractive and match the needs of current society. Accordingly, those specializing in the field are developing unique educational contents. Orthoptics educators have developed new educational programs for orthoptic practices in which "scientific poster exhibition," "simulation of visual disturbances," and "interview role playing" are used to achieve the educational goals for the given scholastic year.

Introduction

On the threshold of the 21st century, the Japanese educational system has rapidly become more flexible. Legal regulations on educational curriculums for the medical professions have been amended, beginning with the amendment of the controls on the designation of training schools for public health nurses, midwives, and nurses. The Ministry of Health and Welfare has announced that it will amend controls on the designation of training schools for orthoptists (ORT) in the near future. In step with this trend, changes in the designation of schools for speech-hearing therapists established in August 1998, will allow schools to have much more flexible educational curriculums. Curriculums provide valuable direction to each medical profession and should have contents which meet contemporary needs[1][2][3]. To survive, present day medical profession training schools must create original educational and training courses that are meaningful and

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meet the needs of current society. Accordingly, those specializing in ORT and other fields are developing innovative educational contents.

Kawasaki University of Medical Welfare (KUMW) was founded in April, 1991, for the purpose of providing an integrated program for education and research in both medicine and welfare. It was the first such program in Japan. A clearly focused direction, motivated by the goals of the medical profession, is characteristic of the education and training for orthoptists at this university. Unlike other schools, KUMW has a curriculum that prepares students with professional knowledge, the techniques needed to support that knowledge, and the right kind of attitude for working in clinical practice soon after graduation[4][5].

A practical education which is useful in clinical practice is important. Thus, an attempt was made to develop a program which gives students the best education possible in the limited time frame. Although clinical practice is the most desirable way to teach orthoptics, there are physical limits in clinical settings in terms of environmental factors, time, and human resources, and various educational and ethical matters must be considered. As a surviving strategy, a new practical educational process is proposed utilizing poster exhibitions, simulations, and role playing methods to compensate for the limited opportunities to see actual patients. This new program is described in the following section.

1.Scientific Poster Exhibition

For orthoptics majors in the Department of Sensory Sciences, the goal is to give continuity to the contents for each scholastic year. First year students take general subjects other than specialized orthoptics courses. The educational goal for sophomore students is to master the techniques necessary to support their knowledge, and develop the right kind of attitude. Junior students strive to cultivate the ability to discover and solve problems. Senior students learn how to apply their knowledge and develop their creative capacities so that they can work in the medical profession.

According to these educational goals, sophomore students are required to prepare and present scientific exhibitions involving "examinations of the input[6], integration[7], and output[8] systems of vision." To facilitate the understanding of the overall aspects of the "mechanisms of vision," the exhibition themes are related to orthoptics in general, including examinations of the input, integration, and output systems. Groups of two or three students were required to prepare posters on 180 cm by 90 cm sheets, 1.5 sheets per student, stating the purpose, methods, results, discussion, conclusion, and references. A representative from each group gave an oral presentation using posters placed on a stage in a lecture room. After the presentation, the representative was questioned about the presentation by classmates, senior students, and teachers. Subsequently, the posters were corrected and supplemented with additional information to complete preparation of the poster. The posters were exhibited by sophomore students under the general theme "The information processing mechanism of vision –examinations of

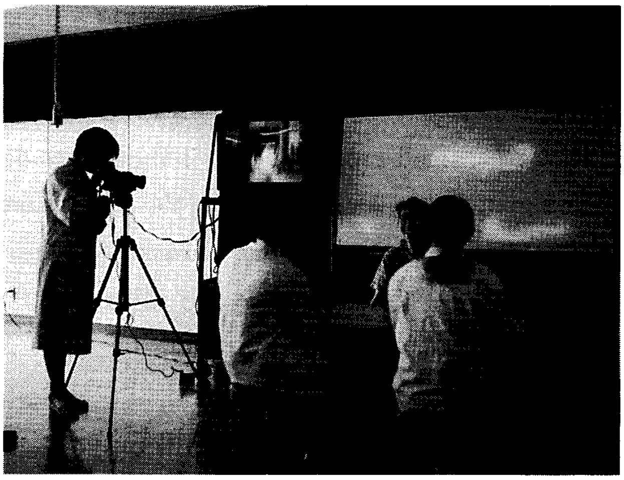

Fig. 1 A role-playing class using videotapes

the input, integration, and output systems." Various aspects were studied, including, "What are the first, second and third neurons?"; "What is visual acuity? – definition, concept, and description"; "Perimetry: principle and methods"; "Refractometry"; "Accommodation test"; "Fixation test"; "Test with a synoptophore"; "Stereoacuity testing at near fixation"; "Retinal correspondence test"; "Deviation measurement"; "Eye movement test"; and "Accommodative convergence/accommodation (AC/A) ratio examination." These subjects were selected to facilitate students' comprehension of the details of specialized subjects and promote active learning by repetition of knowledge learned and practiced.

Reaction to the scientific exhibition practice was seen in a questionnaire. About 80% of the students thought it was good. The oral presentations were evaluated as being more effective than the usual practice of merely teaching how to produce exhibition posters.

The major merits of poster exhibitions in practical education are the following. (1) Introducing and showing how practical education works can be done easily. (2) The considerable extent to which active participation in learning can be encouraged. (3) Poster exhibitions allow students to reinforce learning and increase scientific creativity because they are exhibited for a period of time in the practice room. (4) Poster exhibitions and the accompanying discussions performed in the manner of a medical symposium deepen students' understanding of the contents of practices, allow students to have a say in what they learn, and help students to clarify unsolved problems. (5) Each poster exhibition theme encourages students to further consider what matters are important in practice, and repetition of this process may improve their problem-solving skills[9]. (6) Because the students in each group were required to complete their posters after they were corrected and supplemented with additional information, they were exposed to a process which gave them an opportunity to acquire accurate knowledge. (7) The link between knowledge and techniques is reinforced by a practical examination after the poster exhibition. In this way, the level of learning each student has attained can be determined. Since the poster exhibitions were performed in groups, the belief is that communication between students was improved, and the synergistic effects of group learning were enhanced because the students enjoyed the learning process. Students in different groups exchanged opinions, discussed problems, and sought to find problem-solving methods. This process is very important in clinical practice when working as a member of a team. Moreover, small-group learning is thought to develop students' abilities to express opinions and communicate with others. On the other hand, students pointed out shortcomings such as the considerable amount of time (2-3weeks) required to prepare the posters and difficulties in understanding the posters presented by other groups.

2.Simulation of Visual Disturbances (Simulation)

Basic practices performed in sophomore classes are applied to junior-year studies. Junior students do simulation training. Namely, visual disturbances in the input, integration, and output systems are simulated by referring to actual clinical cases. Visual acuity, accommodation, and fixation disorders were assumed to be disturbances of the input system. In simulation of disturbances of the integration system, students considered problems in activities of daily life related to binocular disorders such as the presence of a visual disorder with binocularity, a visual field defect with binocularity, or abnormal binocularity. Each simulation practice was coordinated from the initial determination of the problem until the final report. Initially, problems arising from assumed clinical findings were listed. Then, the students sought solutions for these problems, actually solved the problems, and then prepared reports and posters with regard to this process. After presentation of the process, groups of students prepared reports on their assigned themes and put them into a booklet. The causality factors reported on by the students included: "Eccentric fixation pattern and visual acuity," "Visual display terminal (VDT) syndrome and accommodative disturbance," "Binocularity with visual disorder and visual field defect," "Abnormal eye position, binocularity and quality of life," and "Normal and abnormal findings in binocularity tests."

In simulation practice, an important point is that students were encouraged to appreciate teachers' viewpoints. Abnormalities in visual acuity, accommodation, and fixation were assumed to be visual disturbances in the input system, and binocular disorders such as diplopia and depression were assumed to be visual disturbances in the integration system. Refractive abnormalities were artificially produced as visual disorders using trial lenses. For accommodation disorders, the VDT syndrome was produced by actually reading VDT visual works. As a fixation abnormality, each examinee was asked to deviate the visual line to produce an artificial eccentric fixation. Visual disturbances of the integration system were simulated mainly as binocular disorders. With regard to the relationship between visual disturbances and binocularity, monocular or binocular visual acuity was decreased to help the students understand the considerable involvement of visual acuity and fixation in producting binocularity. Moreover, to help students understand the importance of the overlap of visual fields in binocularity, models of various visual field defects such as central scotoma, bitemporal or binasal hemianopsia, and concentric visual field defect were artificially prepared by applying black tape onto trial lenses. In the presence of these artificial visual field defects, tests were performed to determine how they affect binocularity. Students experienced behavioral abnormalities associated with binocular disorder by wearing trial lenses with membrane prisms attached to produce horizontal or vertical diplopia. Students also experienced inconveniences in everyday activities such as reading or going up and down stairs by undertaking these activities during simulation of severe binocular or monocular disturbances. Results obtained during the students' actual experiences as examiners or examinees were summarized by individual students or groups of students in draft reports. Included were the purpose, methods, results, discussion, and conclusion. Each report was presented and discussed, and then a final report was submitted after adequate corrections and additions had been made.

In simulation practice, students were motivated to learn from their experiences. Simulation practices were found to have the following merit: students can actually experience abnormal visual functions which cannot be experienced by normal people, and this facilitates the ability to look at problems from the patient's perspective. However, the simulation of disorders has limitations which require further improvement because it is extremely difficult to exactly mimic sensory disorders[10][11].

3.Interview Role Playing (Role Playing)

Role playing practices were performed by junior and senior students. Role playing enabled students to become aware of the feelings and problems others may have in a given situation. After a particular orthoptic problem was chosen, students played roles related to that problem in turn. Next, the participants (students and teachers) held a discussion on problems that they had noticed, and each student sought to find ways to solve them. Juniors played the role of the orthoptist, instructors played the role of patients or family members, and seniors played all roles. The main themes of role playing were "How to approach patients according to age" for juniors and "Orthoptic management" for seniors. These themes were selected because they are the complaints and symptoms most frequently reported by orthoptic patients with fully available medical histories in routine clinical practice. The specific contents of role playing included "examination and therapeutic/training planning, evaluation, patient education, and directions for the timing of training withdrawal" for junior students, and "the directions of orthoptic training and management" for senior students. Junior students participated in role playing involving "clinical characteristics of various types of strabismus, amblyopia, nystagmus, and neurophthalmologic diseases," and "utilization of problem-oriented medical records (POMR) on various types of strabismus/amblyopia, acquired external ophthalmoplegia, and eye movement disorders." Senior students were given patient summaries from the Orthoptic Clinic, Department of Ophthalmology, Kawasaki Medical School Hospital. They then prepared manuscripts and scripts for particular subjects. Again, they played all roles, including orthoptist, patient, and family member. The teaching staff advised students who lacked sufficient experience with actual clinical cases. These students were encouraged to imagine how they would feel if they were family members, and what fears and anxieties they would have if they were patients. Each role playing session took about 10-15 minutes, and was videotaped (Fig.1). After the session, the videotape was reshown and used for a discussion.

Role playing was performed by setting up situations. For junior students, the situations were : (1) How to communicate with a 5-year-old boy who came to the hospital because of a visual disturbance and strabismus detected at a preschool health checkup, how to communicate with his parents, and what should be done for him first. (2) A 21-year-old female computer operator who came to the hospital with her mother because she had trouble sleeping and recently noticed asthenopia and decreased visual acuity. She had anisometropic amblyopia with monocular hyperopic astigmatism with a history of training for correction of the amblyopia and surgery for exotropia at the age of 6. For this patient, students were asked to think "What are the main complaints at the present time, and what problems does she have?"

In role playing for senior students, "clinical characteristics of accommodative esotropia" was selected as the theme. After the students observed pairs of photographs taken by a photographer, with and without glasses for accommodative esotropia, role playing was performed for the following: (1)to extract possible disease-related problems; (2)to discuss clinical characteristics and problems in differential diagnosis, treatment, and training methods; and (3)to determine problem-solving methods. Students were trained in the communication skills needed to educate patients. In three situational settings, i.e., "do not want to wear spectacles," "do not want to wear an eye patch," and "unable to participate in training every day because of an advancement to the next grade in elementary school," students discussed actual methods needed to teach patients how to solve problems in orthoptic management.

In the evaluation, 88.4% of the students replied "It was better than the usual class." To the question "Which point of the class was good?", 81% of junior students thought "The proper way to interact with patients" was good while 78% of senior students thought "How to integrate knowledge" was good. On the negative side, 23% of the juniors and 35% of the seniors felt "There was much stress." Also, 20% of the students felt "Taking notes was difficult." Role playing was performed according to scenarios in which several problems were inserted according to the educational goal. Therefore, flexible thinking was required to solve the problems, and this led to the integration of knowledge and techniques, and an education in human behavior[12]. The students were also afforded the opportunity to verbally express problem-solving methods[13].

Since holistic medical care is required at the present time, the orthoptic educational programs described in this article are excellent methods of practical training for medical professionals to cope with the needs of society.

Conclusions

A new educational program was developed and introduced to orthoptic practices in order to cultivate the problem-solving and application abilities needed by medical professionals. In this new program, orthoptics practices were taught using scientific poster exhibitions, simulations, and role playing. This program motivated students to learn more and increased their capacity to recognize related problems by themselves. The program also provided an excellent practical education which cultivated the ability to discover and solve problems. These methods are recommended for use at other universities as suitable training for orthoptists in the 21st century.

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6. Input is a pathway from the eye to the brain (occipital visual cortex).
7. Integration corresponds to the area from the occipital visual cortex to the visual association area.
8. Output is a pathway from the brain to the eye (extraocular muscles).
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