

Field report

Tele-education by an orthopedic specialist increased the confidence in orthopedics of a general practitioner at a rural solo-practice clinic

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Abstract

Objective: General practitioners in rural clinics are required to deal with musculoskeletal problems, but they often lack the confidence. We aim to confirm changes in their confidence in orthopedic practices after using tele-education.

Materials and Methods: We conducted tele-education in orthopedic practices from June 1, 2022, to November 30, 2022. Using a teleconference system, the first author, an orthopedic specialist, provided tele-education training to an independent general practitioner in a rural clinic. We adopted a 7-point Likert scale to assess the general practitioner's confidence levels. In pre- and post-research, the counts and confidence levels in the scale were assessed for 18 types of orthopedic practices each month. Furthermore, we interviewed the general practitioner to examine the factors influencing their confidence.

Results: The confidence levels increased for all measurement items. The most experienced orthopedic practice was "Advising on daily care for musculoskeletal problems", with confidence levels increasing from 3 to 6. The least experienced orthopedic practice was "Manipulative reduction of radial head subluxation", with confidence levels increasing from 4 to 5. The factors that influenced the change in confidence levels were regular feedback and unrestricted availability of consultations.

Conclusion: Tele-education in orthopedics may enhance general practitioners' confidence in orthopedic practices.

Key words: confidence level, orthopedics, telehealth

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Introduction

Telehealth is spreading rapidly worldwide, particularly with the recent developments in communication technology and remote operations due to the COVID-19 pandemic¹. Telehealth education is increasing in various ways overseas, ranging from verbal education to education using still and moving images^{2, 3}. Various orthopedic telehealth reports have been published on diagnosing bone fractures, surgi-

cal support, and postoperative follow-up^{4, 5}; however, there are no reports on tele-education, particularly on factors that increase confidence levels in orthopedics.

General practitioners are required to provide orthopedic services, such as sprain splinting, daily care advice for musculoskeletal problems, and initial treatment of simple fractures⁶. However, some reports indicate they lack the confidence and knowledge to manage musculoskeletal conditions⁷. No reports have focused on general practitioners' confidence in orthopedic practice, nor do any reports of tele-education in orthopedics for general practitioners exist.

In this research, we conducted tele-education in orthopedics for a general practitioner working independently in a rural clinic. We not only confirmed changes in their confidence in orthopedic practices before and after the research but also examined the factors influencing them.

Methods

In this research, the first author, an orthopedic specialist

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with more than 10 years of experience in rural medicine, provided tele-education in orthopedics to a general practitioner. The practitioner was a 31-year-old woman with 8 years of experience as a physician working independently at the Nakadomari National Health Insurance Kodomari Clinic. The nearest orthopedic specialist is based one hour away by car from this clinic. The Hirosaki University Graduate School of Medicine Ethics Committee determined that this research did not constitute medical and health research involving patients; therefore, it did not require an ethical review.

We used a 7-point Likert scale to assess the general practitioner's confidence levels in orthopedic practices before and after the research. The confidence levels were assigned to previously reported orthopedic practices required for general practitioners⁶⁾. In this research, osteoarthritis of the knee, scapulohumeral peri-arthritis, and acute monoarthritis were surveyed separately for diagnosis and treatment. Animal or human bite was also surveyed separately for initial care and follow-up. The total number of items was 18.

We also confirmed whether the general practitioner had received instructions from another orthopedic specialist or had previously practiced orthopedics independently. The details of the 7-point Likert scale are as follows: 1 - "very low confidence", 2 - "low confidence", 3 - "a little unsure", 4 - "average", 5 - "a little confident", 6 - "confident", and 7 - "high confidence". The first author interviewed the general practitioner in a semi-structured discussion format before and after the research; the content was recorded, and the dialogue was transcribed into a text file. Confidence-relevant information was extracted from these transcripts.

The research period was from June 1, 2022, to November 30, 2022. Once a month for approximately 60 min, the first author educated the general practitioner using a tele-conference system. The author answered questions and gave feedback on the general practitioner's responses to the orthopedic practices they experienced through a one-on-one interactive dialogue and screen sharing. In addition, during the research period, the general practitioner and the author communicated on the telephone about queries associated with orthopedic practices; the author responded to the questions. We counted the number of orthopedic practices the general practitioner performed every month.

Results

The educational content covered during the tele-education in orthopedics is presented in Table 1. The only orthopedic practice that the general practitioner had not experienced prior to the commencement of the research was "Initial treatment of simple fracture (splinting)". However, by the end of the research, it had been encountered. Orthopedic practices in which the general practitioner received no

Table 1 Learning contents of tele-education in orthopedics

Diseases
Acute monoarthritis
Animal bite
Ankle sprain
Bursitis (olecranon, prepatellar, pes anserine, lateral malleolus and medial malleolus)
Crowned dens syndrome
Fibula fracture
Frozen shoulder
Ganglion cyst
Mallet finger
Osteoarthritis of the knee
Pigmented villonodular synovitis
Rheumatoid arthritis
Rib fracture
Spontaneous osteonecrosis of the knee
Tick bite and related disorders
Physical examinations
Ankle joint
Knee joint
Shoulder joint
The distal interphalangeal joint of the fingers
The metatarsophalangeal joint of the toes
Treatments
Acute monoarthritis
Animal bite
Conservative treatment of middle phalanx fracture of the little toe
Conservative treatment of rib fracture
Ganglion puncture
How to remove a fish hook
Initial treatment of simple fracture
Intraarticular injections (shoulder and knee)
Rehabilitation methods for shoulder joint contracture
Suturing of wounds
Tick bite and related disorders
Trigger point injection
Others
Anatomical knowledge of the knee and shoulder joint area
Method of radiography of the scapula
Pharmacokinetics and precautions of pain relief patches
Rehabilitation after crush injury of the distal interphalangeal joint of the index finger
Tetanus toxoid usage for trauma
The usage of ultrasonography in the diagnosis of bone fractures

specialist instruction prior to the start of the research were "Managing osteoarthritis of the knee", "Initial care for animal/human bite and follow-up", "Initial treatment of simple fracture (splinting)", "Splinting for sprain", "Treating acute monoarthritis", and "Diagnosing and treating scapula-humeral peri-arthritis". After the research, the confidence level in orthopedic practices required by general practitioners increased in all items on the 7-point Likert scale; the details are presented in Table 2. The most frequently performed

Table 2 Confidence scale before and after the research, and the total number of occurrences for orthopedic practices during the research

	Before research	After research	Number of occurrences for orthopedic practice (n)
Advising on daily care for musculoskeletal problems	3	6	158
Performing trigger point injection	3	6	31
Managing osteoarthritis of the knee	2	6	26
Diagnosing osteoarthritis of the knee	3	6	24
Performing knee arthrocentesis	3	6	18
Hemostasis for superficial bleeding	5	7	12
Diagnosing scapula-humeral peri-arthritis	1	6	12
Treating scapula-humeral peri-arthritis	2	4	8
Diagnosing acute monoarthritis	2	6	7
Treating acute monoarthritis	1	6	7
Suturing cut wounds	4	7	6
Performing digital block	4	7	5
Splinting for sprain	3	7	4
Initial care for animal/human bite	1	5	3
Follow-up for animal/human bite	3	5	3
Initial treatment of simple fracture (splinting)	1	5	2
Deciding to apply bust band for chest trauma	3	6	1
Manipulative reduction of radial head subluxation	4	5	0

Degree of confidence is a 7-point scale: 1 - "Very low confidence", 2 - "Low confidence", 3 - "A little unsure", 4 - "Average", 5 - "A little confident", 6 - "Confident", and 7 - "High confidence".

orthopedic practice in this research was "Advising on daily care for musculoskeletal problems", with 158 cases. The least performed was "Manipulative reduction of radial head subluxation". Two telephone consultations were conducted during the research period. One was for a ganglion cyst infection, and the other was for a distal phalanx fracture of three to five fingers in a pediatric patient. The low confidence level in orthopedic practice prior to the start of this research was attributed to the fact that the practitioner had rarely performed orthopedic practices independently. The factors that influenced the change in confidence levels were regular feedback and unrestricted availability of consultations.

Discussion

The educational content of tele-education in orthopedics was comprehensive enough to include the previously reported orthopedic practices required for general practitioners⁶. Tele-education in orthopedics increased the confidence level of a general practitioner working independently in a rural area. Regular feedback and unrestricted consultation availability were critical factors in this research.

A Japanese study on tele-education for emergency responses reported that participants' confidence in taking action during disasters increased, and this might motivate them to learn more about it and assist others during distressing times⁸. Periodic tele-education has also been reported

to increase the self-efficacy and knowledge of clinicians trained in chronic pain management⁹. Similarly, this research found that tele-education in orthopedics improved general practitioner's overall confidence levels in orthopedic practices.

Prior to the start of this research, the low confidence level in performing orthopedic practices was attributed to the general practitioner rarely performing them on their own. Previous studies have reported that past experiences and successes lead to increased confidence levels¹⁰. Likewise, the tele-education in orthopedics for the general practitioner might have increased their confidence levels, as they independently and successfully conducted orthopedic practices afterward. Therefore, tele-education in orthopedics by orthopedic specialists would help general practitioners.

Conclusion

Tele-education in orthopedics would increase general practitioners' confidence in orthopedic practices. We hope that such education for general practitioners working in rural areas would spread widely in the future.

Conflict of interest: None.

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Ethics approval and consent to participate: The Hiro-saki University Graduate School of Medicine Ethics Committee determined that this research did not constitute medical and health research involving patients, and thus, ethical review was not required.

Consent for publication: Written informed consent was obtained from the general practitioner in this research.

Data availability statement: The data supporting our study's findings are available from the corresponding author upon reasonable request.

Author contributions: TA conceived the idea and wrote the original draft of the manuscript. TA was responsible for data acquisition and analysis. All authors discussed the data and commented on the manuscript. All authors revised and edited the manuscript. All authors approved the final manuscript before submission.

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