

Sport in the Rehabilitation of Patients After Total Laryngectomy

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Abstract. *Aim: Laryngectomy due to cancer leads to decreased physical activity of patients. Rehabilitation programs focus on the improvement of voice and swallowing but the role of rehabilitation sports for such patients is unknown. Patients and Methods: We interviewed all 38 patients (five women, 33 men; median age 56 years) of our patient's advocacy group. All had undergone laryngectomy because of cancer. We asked them to report their sporting activities and summarized their descriptions. Results: Overall, 12 patients were members of our swimming group and had performed aqua gymnastics and swimming training in order to stabilize or improve the muscle structures of the neck and backbone. A further four patients only took part in swimming training. The training frequency was twice per month; when patients were introduced to the program, they increased this frequency to 4-5/month. Three patients started cycling with mountain bikes covering distances of between 30 and 50 km. A further two patients were able to follow our cycling program using e-bikes. Twenty patients reported walking weekly between 10 and 16 km. All patients summarized the positive impact of sports on their personal well-being. Conclusion: Swimming, aqua-fitness, cycling and (Nordic) walking are favourable sport disciplines for patients after laryngectomy for laryngeal cancer. Special training programs should be developed and included in rehabilitation procedures for patients after multimodal therapy of laryngeal cancer.*

For more than 50 years, total laryngectomy has been the definitive treatment of patients with laryngeal and

hypopharyngeal cancer in Germany. The overall prognosis of most of these patients is favourable (1). Metastatic disease is common only in cases with cancer of the hypopharynx (2). Nevertheless, resection of the larynx is a functionally destructive procedure and the loss of essential functions is a routine consequence of this type of surgery. The patients will lose their ability to speak, swallow, taste and to breathe *via* the nose. In addition, adjuvant radiotherapy can produce xerostomia, dental problems and fibrotic reactions (3, 4). The appearance of the face changes, tracheostomy is publicly visible, and breathing is related to noises, coughing and the production of secretions. Social isolation becomes a real problem for the majority of these patients and a medical and social rehabilitation program is necessary to restore the quality of life after curing cancer.

The current study describes the role of rehabilitation sport for patients with cancer who have lost their larynx. The basic tenet of this work is that sport should be the first step to restoring an active life for our patients. In addition, recent studies showed that physical activity in patients with cancer is related to a better quality of life and to less symptoms of fatigue and depression (5-9). An association also exists between the practice of physical activity and sport, and overall and cancer-specific survival, particularly after breast, colonic and prostate cancer (10).

Patients and Methods

The majority of patients with laryngectomy belong to the German Society of Laryngeal Patients [Bundesverband der Kehlkopferoperierten (BV)]. Each German Department is in close contact with its group of 30-50 patients. BV members often come to clinics to visit new patients, to explore the new situation and to organize daily help for them or their families.

Part 1 of the project. We asked the members of our BV group to give us information regarding their sporting activities, their experiences and thoughts. These interviews were semi-structured. The results were documented and summarized in MS Excel tables. Questions asked were:

Dedicated to all our laryngectomy patients, who are our teachers.

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- i) Did you have experience with sport before you had cancer?
- ii) Have you ever done sports after being diagnosed with cancer?
- iii) Which type of sport would be your personal favourite?
- iv) Do you have a personal rehabilitation sport program?
- v) What is the best basis for organizing rehabilitation sports?
- vi) Did you get any professional help in this regard?

Part 2 of the project. We founded an aquatic therapy group at our Department. All interested patients received aquatic therapy equipment and we organized dates and program with introduction, water physiotherapy and emergency training. For 3 years, between five and 10 patients and their relatives meet and perform physiotherapy activities, games, swimming exercises, and have social contacts. We also performed interviews regarding the water activities. The reports were documented and again summarized in MS excel tables. Our questions were:

- i) Did you enjoy the ability to go to water and perform physiotherapy?
- ii) What types of symptoms became better after hydrotherapy?
- iii) How often have you taken part in the meetings of hydrotherapy group?
- iv) What is the distance between Nordhausen and your home?
- v) What does this activity bring to your daily life?
- vi) Would you recommend aquatic therapy to other patients?
- vii) Would you like further sport therapy programs?

In 2014, we performed a total of 38 interviews with laryngectomy patients at meetings of the BV group. The study included five women and 33 men. The median age was 56 years (range=41-79 years). The interview was done between 6 months and 12 years after laryngectomy (median=4 years). All patients gave their informed consent for us to document and analyse the interviews.

The hydrotherapy group met each month during 2014. We were able to obtain information from 16 patients (two women, 12 men) and four relatives who had taken part during this time. Their median age was 56 years (range=41-73 years). The time window was a median of 17 months (range=6-38 months) after laryngectomy. Parts of the exercise were documented by video and photographs. All patients have gave their informed consent for publication of the observations and experiences.

Results

Part 1 of the project. A total of 31/38 patients reported on sporting activities during their youth or as young adults. Soccer and other ball games were their favourites in the past. A total of 34/38 patients had learnt to swim in their youth.

Twenty-six patients reported on their sporting activities after cancer diagnosis. Sixteen of them had used our offered hydrotherapy program. A further 10 patients reported about walking and cycling with their families or friends.

Swimming (12 patients), cycling (five patients) and walking (20 patients) were the disciplines which are performed in groups and which were addressed as favourable ones. Three out of 38 patients had been prescribed their personal sportive rehabilitation program (despite the hydrotherapy).

Twenty-four out of eight patients wished to participate in the sport program organized by health insurance or professional organizations (hospital, physiotherapy offices). Fourteen interviewed patients said they would favour

independent offers by self-help organizations or patient groups like BV. Our hydrotherapy program was the only professional help which was offered to all of the patients we interviewed.

Part 2 of the project. Overall, 15/16 patients gave positive responses regarding the water sports. Twelve out of 16 had used special physiotherapy therapies, four only came for swimming.

Improved pain situation was reported by all patients. Shoulder and neck pain were reduced after 3-4 training periods.

The typical patient had participated in a median of 8 out of 12 meetings (range=3-12) during 2014. Four out of 16 patients had only taken part in the introduction and first water experiences. All had used the hydrotherapy equipment for their individual swimming.

The patients lived a median of 34 km (range=1-198 km) from Nordhausen. Individual swimmers had to travel between 198 km and 135 km for their training.

Figure 1 shows the responses regarding the impact of hydrotherapy on daily life. All patients had seen an improvement of self-activity. The majority (14/16) reported having feelings of fun and power. Improvement in social contact was endorsed in 12/16 cases and all relatives reported experiencing more balanced family relations.

Overall, 14/16 patients said they would recommend the aquatic experience to other patients; 13 have already done so. All relatives also repeated their experiences to the BV group.

Three of our active patients wished for further structured programs, as well as the aqua pool. The combination of swimming, aquatic gymnastics and cycling seems to be most favourable for this group.

Discussion

Since the times of parish priest Sebastian Kneipp (11) and even long before, the healing power of water and water treatments has been well known (12). It has been used and is still in use for prevention and rehabilitation of a large variety of physical and functional disorders (13, 14).

Physical interventions are generally regarded to be part of Complementary and Alternative Medicine and not as an accepted part of standard treatment (15). However, the premise that sport and physical activity is the best form of rehabilitation for patients with cancer is most commonly accepted (16) but functional deficiency may limit the possibilities for individual patients.

Nevertheless, aqua-based exercise and hydrotherapy may have a special place (13, 14). Karamzadeh *et al.* reported on aquatherapy in 2001 (71). They stated that only a small number of highly activated patients took part in aquatic activity programs. We recorded a higher rate of participation, *i.e.* a third of our patients used the opportunity for

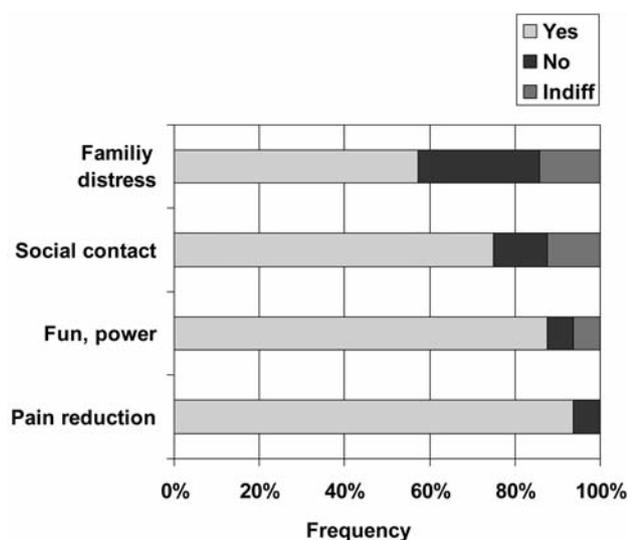


Figure 1. Impact of hydrotherapy on patient's daily life (n=16).

physiotherapy and water sport activities *via* BV and organized training lessons. Nevertheless, even this proportion of patients is too small because all laryngectomy patients have the described deficiencies and it is necessary for most of them to take part in a rehabilitation program.

Two aims are important for laryngectomy patients in order to improve their physical activities. Firstly, one should consider the individual dysfunctions after surgery and adjunctive radiotherapy schedules. The majority of patients will have muscular dysfunction of the shoulder and respiratory problems because of repeated inflammation. Muscular training should be concentrated on the shoulder and the neck muscles. Aquatic therapy may be a key to good physiotherapy of the shoulder and could be the first step to aqua gymnastics.

Secondly, the cardio-respiratory power of such patients is also reduced. This requires a conditioning training program. The majority of the patients have favourite types of sport. Walking and cycling are disciplines with positive effects and Guy patient can do these activities. Swimming with hydrotherapy equipment is possible, but a few patients will perform it because of their self-consciousness about reactions of the public. Aquagym may be a very effective sport for improving the cardiac and respiratory systems. It must be organized in groups.

The reports of our patients are similar to the data published by Crevenna and colleagues. They reported improvement of quality of life, decreasing pain and overcoming social isolation for those patients who took part in the Vienna Hydrotherapy Group in 2003 (18). Similar effects were seen by Hegner *et al.* (19). They regarded hydrotherapy as part of a complex rehabilitation program.

Recently, several studies examined the role of physical activity and sport in oncology (8-10). They generally found a benefit of physical activity interventions (6, 7). Specifically, patients experienced improvements in lean body mass, muscular strength, physical functioning, quality of life and fatigue management (10). These effects were also found in patients with head and neck cancer (5, 8, 9). An effect on overall and cancer-specific survival, as primarily seen in breast, colonic and prostate cancer (10), can be hypothesized, but has not yet been proven.

Cycling and walking are new disciplines regarding such rehabilitation sports for laryngectomy patients. Both sports offer improvement of the shoulder and back bone muscles and can be performed without any professional help. Further research should concentrate on these fields because cycling and Nordic walking are possible nearly everywhere at anytime.

Conclusion

In summary, sportive rehabilitation could be the first step to a normal life for laryngectomy patients and should be supported by physicians and care professionals. Hydrotherapy is a new form of re-starting physical exercises and may be prescribed for each patient after successful resection of cancer.

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