Understanding the Role of Exercise in the Care Pathway for Head and Neck Cancer Surgery: Patient and Health Care Provider Perspectives

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Abstract: Head and neck cancer (HNC) surgical patients experience high symptom burden. Exercise prehabilitation has the potential to improve patient outcomes, but the perspectives of patients and healthcare providers (HCPs) must be considered to facilitate implementation. The purpose of this study was to obtain qualitative feedback from HNC surgical patients and HCPs regarding: (1) adding patient assessments across the HNC surgical timeline, and (2) the logistics and potential benefits of a future exercise prehabilitation intervention. Semi-structured interviews took place with patients and HCPs. Interview questions included satisfaction with study recruitment, measurement completion, impact on clinical workflow (HCPs), and perceptions of a future prehabilitation program. Transcripts were analyzed using a constructivist philosophy and interpretive description methodology. Ten patients and ten HCPs participated in this study. Four themes were identified: (1) the value of exercise and its importance in clinical care, (2) acceptability and necessity of assessments, (3) factors to support implementation, and (4) the components of an ideal prehabilitation program. Overall, these findings highlight the importance and value of exercise across the HNC surgical timeline from both the patient and HCPs' perspective. These findings will inform the future implementation of a multiphasic exercise prehabilitation trial in HNC surgical patients.

Keywords: head and neck cancer; exercise oncology; prehabilitation; patient-oriented research; cancer survivorship; qualitative research

1. Introduction

Globally, over 550,000 people are diagnosed with head and neck cancer (HNC) each year [1, 2]. Due to the location of these tumours, HNC surgical patients often experience high symptom burden from treatment, which can negatively impact their physical functioning (e.g., impaired neck and shoulder mobility, difficulties with speech and swallowing) [3, 4], and psychosocial functioning (e.g., depression, anxiety, impaired quality of life) [3, 5-8]. In an effort to improve patient outcomes, exercise prehabilitation is a possible complementary addition to the existing clinical care pathway in HNC surgical patients.

Exercise prehabilitation, which is defined as an intervention delivered over the surgical timeline and into recovery (i.e., multiphasic) aimed at improving peri and post-operative outcomes [9-11], has the potential to improve patient-reported, clinical, and process outcomes. Specifically, exercise prehabilitation may help reduce treatment-related impairments or side effects, the risk of post-surgical complications, hospital length of stay (LOS), and costs of care [9, 10, 12-14]. While it is increasingly recognized that exercise can be an adjunct therapy that helps counteract the adverse effects of cancer and its treatment [15, 16], implementing an exercise program in a complex patient population and as part of clinical care is challenging [17]. Current peri-operative care already includes several pre-surgical consultations, multiple site wound care, initiation of speech and swallowing rehabilitation, nutritional care, and post-discharge follow-up appointments [18]. Thus, it is critical to understand the needs of both patients and health care providers (HCPs) prior to adding exercise prehabilitation to this care pathway. Engaging patients via a patient-oriented research (POR) approach can provide information on exercise barriers and preferences, and can help identify patient priorities and unmet needs [19, 20]. In addition, the view of HCPs is critical for understanding the logistics of clinical workflow to support exercise prehabilitation implementation [19, 20]. The purpose of this study was thus to obtain qualitative feedback on (1) adding patient assessments across the HNC surgical timeline and (2) the logistics and potential benefits of an exercise prehabilitation intervention.

2. Materials and Methods

2.1 Participants

This study was approved by the Health Research Ethics Board of Alberta Cancer Committee (HREBA.CC-18-0564). All participants were part of a larger study on the feasibility of completing measures of patient-reported outcomes (PROs), physical function, and in-hospital mobilization across the HNC surgical timeline [21]. Recruitment for the larger study occurred from August 2019-March 2020. Both verbal and written consent were documented via a secure web application for building and managing online surveys and databases (Research Electronic Data Capture; REDCap) [22].

2.2 Procedure

2.2.1 Interviews

The lead author conducted semi-structured interviews with patients and HCPs (≤ 45 min duration) using standardized interview guides based on previous work in this field, designed to capture patient and HCP experiences. These interview guides can be found online: <https://osf.io/qw4zx/>. The second author was present at most interviews and in some cases, patient caregivers were also present. If participants were not talkative, the lead author paraphrased responses and confirmed perspectives were accurately captured through prompted questions. Interviews were audiotaped and transcribed verbatim.

2.2.2 Interviews with Patients

Patients were invited to take part in an interview at two timepoints: (1) in-hospital, 7-14 days after surgery, and (2) 6 ± 2 weeks post-surgery, during the follow-up assessment. Interviews were optional and patients were able to decline if they were not feeling well. Specifically, interviews took place only if/when the patient was feeling well enough to take part, according to judgement of HCPs (i.e., for in-hospital interviews; recovering adequately, able to engage in conversation), in addition to verbal consent from the patient.

Questions during the inpatient interview captured patient satisfaction with completing measures (e.g., *could you please tell me about your overall experience with the study thus far?*) and took place in the participant's private hospital room. The aim of the second interview was to gather important information on the perceived value of implementing a future exercise prehabilitation intervention for HNC surgical patients. Specifically, patients were provided with a prehabilitation program scenario and were asked questions about program components (e.g., *Frequency, Intensity, Time, and Type (FITT) principles, as well as other aspects of the intervention, such as preferred location for exercise*). To facilitate patients' understanding of these principles, prompts such as the Rating of Perceived Exertion scale [23] were included. For the patients that did not complete the in-hospital interview, the second interview combined both sets of questions.

2.2.3 Interviews with the Clinical Team

Interviews with HCPs occurred in the last two months of recruitment, once new workflows for the wider study had been established. Interview questions were designed to obtain feedback on the satisfaction of the recruitment and assessment procedures (e.g., *please tell me about your experience with this recruitment process*), ease of implementation (e.g., *please tell me about what you think about adding in these measures to the usual care for the HNC surgical patients*), and clinical logistics (e.g., *what do you need from us, as exercise experts, to make this successful within the hospital setting?*). HCPs were also asked about the perceived value of implementing an exercise prehabilitation intervention for future

HNC surgical patients and were provided with the same scenario as patients, plus questions specific to the clinical logistics of implementation.

2.3 Analysis

The interviews were conducted using a constructivist philosophy, which acknowledges that multiple social realities exist, with each meaning based on social and contextual understanding of everyday life, as well as lived experiences [24]. Interpretive description (ID) methodology was used and is well-established in the health sciences literature [25]. ID addresses practical health questions and is used to generate themes and cohesion between a particular phenomenon and individual deviation. ID is often used as the “*scaffolding*” for a qualitative study. For the context of this study, ID was used to inform exercise prehabilitation integration within clinical practice. Representative quotes were taken from transcripts that were analyzed verbatim by the lead author (JD) in NVivo12 and discussed with the second and senior author. In the analysis, quotes with repetitive words, lip smacks, or mumbled speech were replaced with “[...]” to enhance readability, and identifiable information was removed. To ensure a rigorous study, the four approaches specific to ID were followed, including epistemological integrity, representative credibility, analytic logic, and interpretive authority [25]. In addition, content experts in ID were consulted through critical discussion around the interview themes.

3. Results

3.1 Participants

Patient characteristics are presented in Table 1. A total of ten HNC surgical patients participated in interviews, ranging in age from 44 to 71 years (mean $\pm$ SD; 61 ± 9 years) at the time of enrolment, and most identified as male ($n=9$). Due to symptom burden (primarily due to fatigue or difficulties speaking), only one patient completed an interview at both timepoints, and nine completed an interview 6 ± 2 weeks post-surgery. Ten members of the clinical team participated in interviews, four of which identified as male and six as female. HCPs included surgeons ($n=4$), oncology nurses ($n=2$), a physiotherapist ($n=1$), a unit manager ($n=1$), a clinical nurse educator ($n=1$), and a unit nurse/research assistant ($n=1$).

Table 1. Baseline Characteristics of Patients Scheduled for Oncologic Resection with Free-Flap Reconstruction, $n = 10$ and Health Care Providers, $n = 10$.

Patient Characteristics	No. of Patients
Gender	
Male	9 (90%)
Female	1 (10%)
Age: Mean $\pm$ SD, y	60.8 ± 8.5 (Range: 44-71)
Time Until Surgery: Mean $\pm$ SD, days	10.5 ± 8.6
Primary Tumour Site	
Oral Cavity	8 (10%)
Oropharynx	1 (80%)
Paranasal sinuses	1 (10%)
Cancer Stage	
I	1 (10%)
II	2 (20%)

III	2 (20%)
IV	4 (40%)
Unknown	1 (10%)
Histology	
Squamous Cell Carcinoma	10 (100%)
Ultimate Treatment	
Surgery alone	4 (40%)
Surgery + radiation therapy	3 (30%)
Surgery + radiation therapy and chemotherapy	3 (30%)
Demographic Variable	No. of Patients
Race	
White	9 (90%)
Not Specified	1 (10%)
Employment Status	
Disability	1 (10%)
Part Time	3 (30%)
Full Time	4 (40%)
Unemployed	2 (20%)
Annual Family Income, CDN\$	
\$60,000-79,999	1 (10%)
\$80,000-99,000	1 (10%)
>100,000	3 (30%)
Prefer not to answer	5 (50%)
Smoking Status	
Never Smoked	2 (20%)
Ex-Smoker	6 (60%)
Current Smoker	2 (20%)
Alcohol Consumption	
Never Drinker	3 (30%)
Light Drinker	2 (20%)
Moderate Drinker	1 (10%)
Heavy Drinker	2 (20%)
Previous Drinker	2 (20%)
<i>HCPs (n=10)</i>	
Gender	
Male	4 (40%)
Female	6 (60%)
Discipline	
Surgeon	4 (40%)
Oncology Nurse	2 (20%)
Physiotherapist	1 (10%)
Unit Manager	1 (10%)

Clinical Nurse Educator	1 (10%)
Unit nurse/research assistant	1 (10%)

Both HNC surgical patients and HCPs provided unique perspectives about completing assessments of PROs, physical function, and in-hospital mobilization via the use of an activity tracker across the surgical timeline, as well as on their perceptions of the logistics surrounding a future exercise prehabilitation trial. Four unique themes were identified and are presented in Figure 1.

Figure 1. Main Themes and Sub-Themes from Analysis

3.2 Qualitative Themes

3.2.1. Theme One: Value of Exercise and its Importance in Clinical Care

Patient Perspectives

Collectively, our sample of patients spoke to the value of exercise as a pillar in their cancer experience. While not all patients reported engaging in regular exercise, they pointed to the need for movement as an integral component of their recovery as it helped to bring normality back after surgery.

[...] it brings a normality back rather than the sick room and the hospital and sitting in a chair and trying to reach over, it brings movement back to [...] this arm and exercise the muscles on my right shoulder and uhm, doing all those small exercises gets, uh gets the body moving, so I think the whole body exercise is so important. P 6.

Part of our cohort included patients who engaged in structured exercise while other patients preferred unstructured activities of daily living that were limited to typical activities, such as housework. Patients described the value of both movement and structured exercise at three timepoints of their surgical timeline; pre-surgery, in-hospital, and post-discharge, into recovery. Some patients spoke to the positive benefits experienced from exercise to date (e.g., helping prepare for surgery, helping to maintain a healthy lifestyle), and to the perceived benefits if they had more exercise during their care (e.g., potential improvements to in-hospital recovery). Exercise was considered important to help patients feel better both physically (e.g., improved mobility) and mentally (e.g., more headspace). Engaging in exercise was viewed as not only important for their recovery and surviving their cancer, but for overall health status.

I think the only reason why I survived the first time with stage four was because I was fit to be able to do it. How many people survive stage four? Usually that's a death sentence. P 2.

HCP Perspectives

As a result of seeing and hearing the benefits of exercise firsthand in their own patients, HCPs in this study described exercise as critical for recovery, emotional well-being, functional well-being, hospital LOS, and wound recovery.

It's priceless, I mean it can't be overstated how valuable it is [...] having seen so many patients over so many years uh, the ones that move feel better, recover better and just feel more alive, they just do better, so I think this is very very important [...]. HCP 6 -Surgeon.

Some HCPs spoke to the differences observed in patients who engage in regular exercise, compared to those who are not regularly active. Collectively, HCPs felt that exercise should play a role in HNC surgical care from pre-surgery, to in-hospital, through immediate recovery, and into survivorship. Moreover, all HCPs indicated they were already sold on the idea of exercise for their patients.

[...] exercise is a hugely important part of [...] going through a big surgery and hugely important the recovery process uhm, though I'm, you know, I'm kind of already, I'm sold on that idea, that there's uhm, it plays a huge role and I think it, it's a huge probably psychologically and emotionally for that part of things, for people uhm, their resilience, being able to get through uh, the recovery and being uhm, you know, feeling stronger and better after the fact. HCP 8 - Surgeon.

3.2.2. Theme Two: Assessments are Acceptable and Necessary

Patient Perspectives

All patients found the overall recruitment and measurement process to be manageable, appropriate, and significant to their experiences across the surgical timelines. Further, patients were happy to participate in a study that could improve care for future patients. While most patients completed questionnaires, the volume was sometimes viewed as excessive or repetitive by some ($n=7$), and some of the individual questionnaire items were not applicable to all. Having the ability to answer “not applicable” or to skip or streamline questions was identified as important.

[...] the questionnaires uhm, the only difficulty I had was the very first time and the one in the hospital, some things hadn't happened yet so it was unclear how to answer those because there was no uh, 'not applicable', or something like that or a way I could say 'I haven't experienced that problem yet so it doesn't count' that was my only real problem with those. P 6.

Conversely, some interviewees found completing the questionnaires allowed them to prepare themselves prior to surgery, reflect on their overall experience, and articulate their recovery. Patients also found the tests of physical function to be relevant to the changes in physical function as a result of surgery, and in some cases, even enjoyed participating in these assessments.

Oh, no problem with that. Yeah, that makes sense to find out uh, in between the before surgery and six weeks, you need to find out what uh, sort of what they, uhm, how fast one recovers from the surgery. I think is really quite critical and I sort of almost wondered if there would be another one like a week or ten days later, to see how the improvement is [...]. P 6.

Finally, while patients perceived the use of the activity tracker as acceptable, many would have preferred more education surrounding its purpose.

Uh, hindsight you probably could've, a bit more emphasis put on the watch and 'hey we're gonna track what you're doing and really want you to push yourself each day P 8.

HCP Perspectives

HCPs in this study described challenges and strengths with the steps taken to implement a new care pathway for HNC surgical patients. HCPs described the surgical consent process as an overwhelming time for patients, and although patients are receptive to hearing about an opportunity that may enhance their experience, only a quick conversation is practical.

I think we know it's a very challenging patient population, not because of the people, particularly but because of what they're being subjected to, they're some, you know, [...] a time-sensitive cancer if I can call it that, something that needs to be addressed, relatively quickly, and uhm, the treatment, at least when surgery's involved is complex and so there's a lot of moving parts. HCP 6 - Surgeon.

Other challenges were expressed surrounding the use of the activity tracker (e.g., adding this documentation to standard clinical workflow). However, once workflow was established, the tracker was viewed positively for enhancing patient outcomes and for facilitating the documentation of movement.

[...] as you may know, we're not very good at documenting mobility, and hence, why I think that these uhm, [activity trackers], might be very useful for nurses in helping reduce some of their workload. HCP 1 - Clinical Nurse Educator.

A main strength described by HCPs was ongoing and clear communication that led to the development of new workflow practices. One HCP felt proud of the new practices to document movement for patients.

[...] when we were in a group and I did say like, 'our unit gets to participate in this and hopefully, you know, we can document uhm mobility differently' like, I was like, they looked at me with like, jealousy and like, just like, 'oh, that's like, into the future.' HCP 3 - Unit Manager.

HCPs also found the PRO and physical function measures to help patients articulate their experiences.

[...][patient-reported outcomes] get patients to intellectualize what's going on with their body, and I think that's, that can be a really helpful process, especially when they start realizing what they can do [...] these questions are pretty, straightforward right, they're about your body [...] there's no right or wrong, they just have to say how they're feeling and I think that kinda introspection's really important at that stressful time. HCP 7 - Surgeon.

Finally, HCPs found that providing patients with assessments fosters a sense of hope by giving them something to look forward to completing after their surgery.

[...] the fact I'm talking to them about the idea of optimizing their journey through this treatment, it, I guess maybe sends a signal that we're already thinking about that far [...] so it's not all doom and gloom, it's not like 'I don't even know if you're gonna make it through this surgery' you know, if I'm already talking about what comes after, you know, then it's, I think kind of puts a bit of a positive spin on things. HCP 10 - Surgeon.

3.2.3. Theme Three: Key Factors Will Support Implementation

Patient Perspectives

Patients spoke mostly to the need for more education and access to resources on a number of domains relevant to their recovery. Patients were interested in education about movement recommendations pre- and post- surgery, data to support the benefits of exercise, nutritional advice, additional support for wound care/rehabilitation during immediate recovery, and more guidance for what to expect along their surgical trajectories. Overall, patients felt that they wanted to be more involved in their own care.

I think a quick consult before they release you from the hospital instead of tryna make you eat pureed food, you have to do that too, but it's to sit down and say 'okay, you know these are resources available

and these are the things you can and can't do,' right, cause I don't know like, I have this new flap, am I not supposed to, you know have a beer? Am I, what can't I do with this flap, they never ever told me right? P 8.

Patients also described the importance of having their surgeon advocate for exercise and encourage participation. While patients expressed interest in participating in a multimodal and multiphasic HNC surgery program, they felt that a fundamental component to yield success is receiving support from their surgeon.

You really wanna listen to him I would think, ha ha, he's the big guy. P 4.

If the doctor woulda told me [...] 'we need you to get your heart movin' so get workin' out hard here in the next month' I would've worked out super hard every day before surgery, right? Uhm, but there was really nothing, just 'go about your life' right, 'enjoy your life' [...]. P 8.

HCP Perspectives

HCPs were enthusiastic about a future exercise prehabilitation program for HNC surgical patients. Key areas for implementation included presenting data for HCPs, including more education for both patients and HCPs, realizing a culture shift in the clinical setting for cancer care, as well as adapting a collaborative team approach along with continuous buy-in from the surgical team.

I think what you're really trying to achieve is a cultural shift, a change in brain functioning for everybody [...] I think what I would be looking at is kind of, the brand, what is the brand of exercise in cancer care and how do we change that on a much larger scale than just you know, largely advertising, what we see in the hospital is going out to people who already believe it. HCP 7 - Surgeon.

Similar to patients, HCPs viewed the surgeon's influence as essential for patient engagement with an exercise program.

[...] I do think that it's important that the patient's surgeon at some point has a direct conversation with the patient to uh indicate how really important it is. HCP 8 - Surgeon.

Several HCPs also pointed to the need of external funding and sustainability considerations for embedding a prehabilitation program outside the context of a study. Looking at the bigger picture, a majority of HCPs perceived a number of barriers to include insufficient funding and lack of support from administrative and policy levels,

[...] right now it's working because it's within the context of a study, right, and uh, and even more so when it becomes an RCT [...] I would image there needs to be some funding to uh, provide support, staff, and so forth to actually uhm, take the patients through all this, right. Like, if it becomes standard of care, who's actually gonna administer all this stuff? HCP 10 - Surgeon.

3.2.4. Theme Four: The Components of an Ideal Exercise Prehabilitation Program

Patient Perspectives

Detailed perceptions of prehabilitation program FITT Principles are described in Table 2. There was variation in what patients preferred at each phase of their recovery. Some patients spoke to the need for a structured exercise program delivered by an exercise specialist, while other patients preferred less formal movement recommendations. All patients agreed that engaging in movement every day is important across the three surgical timepoints, with higher intensity exercise pre- and post-hospital discharge. Overall, patients spoke to the need of considering individual factors such as exercise preferences, accessibility, and other barriers and facilitators.

[...] individualize it and make them feel more special [...]. P 2.

In-hospital was good, I mean, if you do it for an hour in the hospital, you're getting quite a bit of exercise in. P 1.

Is this in-hospital? I'd suggest it for fifteen minutes to begin with somebody. P 2.

Would be good for me in-surgery and in the hospital, there like, five minutes is enough. P 3.

Further, patients seemed to be more receptive to the idea of a prehabilitation program when presented with the terms “movement” and “physical activity” instead of “exercise.”

Yeah, I think uh, movement's a gentle way to say 'you know, get up and move' you know what I mean? Get up and walk, it doesn't have to be you know, your heart doesn't have to race at 170 beats a minute. P 8.

HCP Perspectives

When describing an ideal prehabilitation program, HCPs highlighted the need for exercise specialists involved in the care pathway.

I wish we could start this tomorrow [...] I wish we could have an exercise physiologist in our clinic.

HCP 2 – Oncology Nurse.

HCPs were also responsive to the prehabilitation scenario, and felt that it should be comprehensive and tailored to each individual patient.

It all looks like part of the same package, it all looks very comprehensive [...] I definitely think that the patients would be pleased to hear that there's, there's program in place that they have access to and, and again this whole idea that you know, to some degree, [...] dove tails into survivorship [...] I definitely see this as a huge bonus, like if, this would really, I think, upgrade uh, what we have to offer these patients. HCP 10 - Surgeon.

HCPs also indicated the importance of program timing to promote patient engagement.

[...] the ideal time to present all this to the patient would be as a, on a second visit, that comes after the initial sorta, discussion about uhm, about the primary treatment [...] I think that uhm, they need a bit of time to just sort of digest that, even if like, for 24 hours, just to kind of get their head around what's going on [...] if there was a way to make this part of the, uhm, part of the package, but uh, to present this information like even a day later or something, would, I think it would be, it, we would just get a lot more, I think the patient would absorb a lot more of this. HCP 10 - Surgeon.

Table 2. Patient Perspectives of Exercise Prehabilitation Program Characteristics: Frequency, Intensity, Time and Type (FITT) Principles - Additional Quotes.

FITT PRINCIPLE	PRE-SURGERY	IN-HOSPITAL	6-WEEKS POST SURGERY
FREQUENCY	Pre-surgery, well I did it all the time, it was, like my daily routine. P 1. --	Oh, you know, once a day would be great, just to come in and do a few movements and exercises and just keep	Oh, just still even if you you know, once or twice a day, come and do stuff, depending on you know, how hard it is and how much you gotta do and all that, right. P 1.

	<p>well, I was [going to the gym] three to four times a week. P 2.</p> <p>--</p> <p>I would exercise a bit everyday if I could. P 3.</p> <p>--</p> <p>uhm, you know, prior to surgery I was if possible walking every day and uhm, I'd never thought about going to the gym but I've uhm yeah, just walking and in you know, spring summer and fall, working in the garden and other things like that, that sort of physical activity. P 6.</p> <p>--</p> <p>Uhm, so pretty much every day P 8.</p>	<p>things going, that would be good one, yeah. P 1.</p> <p>--</p> <p>Oh, I'd do it every day. P 2.</p> <p>--</p> <p>I'd have to walk every day, so. P 3.</p> <p>--</p> <p>I would walk at least twice a day, and if I had trouble sleeping, I'd walk again in, at night. P 6.</p> <p>--</p> <p>Uhm, so pretty much every day P 8.</p>	<p>--</p> <p>Every day. Well, I take my Sunday off. P 2.</p> <p>--</p> <p>Oh everyday, yeah, something everyday if not walking, then on the, on the bike downstairs. P 6.</p> <p>--</p> <p>Uhm, so pretty much every day. P 8.</p> <p>--</p> <p>I would say every other day, uhm, for sure [...] I guess if you're doing different activities, you could convince yourself to do something every day [...] I kinda focus on my physio stuff every day, and then I do a big thing every other day. P 10.</p>
INTENSITY	<p>Eight or nine, yeah. P 1.</p> <p>[referring to an intensity scale of 0-10].</p> <p>--</p> <p>before surgery, uh, intense. P 2.</p> <p>--</p> <p>oh, well, pre-surgery, probably pretty intensive. P 3.</p> <p>--</p> <p>Hopefully a hundred percent ha ha ha. P 4.</p> <p>--</p> <p>Pre-surgery I would walk uhm, well I would exercise probably fairly intense, uh, distance walk, at a good speed and then usually do a stair climb or a hill climb or something at towards the end, uhm, [...] post-surgery I haven't got the distance but I push it as hard as I can uhm, for the walk, uhm, so I yeah, I, I exercise as hard as I can. P 6.</p> <p>--</p>	<p>Oh, maybe a five. P 1.</p> <p>[referring to an intensity scale of 0-10].].</p> <p>--</p> <p>in-hospital, it would be have to be say low. P 2.</p> <p>--</p> <p>05: mm, saying again uhm, so I said was, was uh, three days, but the last two days I was walkin' fairly well and everything, so I don't know, let's put that in the middle, I'll say 5. P 3. [referring to an intensity scale of 0-10].].</p> <p>--</p> <p>Probably nothing, ha ha ha. It was pretty tough there, it was. I wasn't getting any getting sleep, so was, I was always tired, I could work for a little bit I guess. P 4.</p> <p>--</p> <p>In-hospital, uhm, I wasn't, lots of the time I wasn't</p>	<p>Oh, y-yeah I'd like to start out lower and move up if I could. P 1. [referring to an intensity scale of 0-10].].</p> <p>--</p> <p>now I'm gonna be down low-moderate. P 2.</p> <p>--</p> <p>uhm, I could go pretty good, I could say 7 or whatever. P 3.</p> <p>--</p> <p>Probably the next two weeks I'll be outside running, so I'll work out pretty, you know, I'll probably try to do, you know 10k a day four times a week, right? Yeah, 10k four times a week, that's where I'll start P 8.</p>

	<p>For me, well, yeah, I mean for me I could've handled a, a moderate uhm, I don't know if that goes for everyone, uh, but yeah. P 10.</p> <p>--</p> <p>I wouldn't have bought-into jumping into a high intensity short-term program. P 10.</p>	<p>exercising as hard as I can because there were people I could bump into and I'd have the, the IV trolley to maneuver and everything else so I could get some distance but I couldn't get uhm, I couldn't get a good exercise, it was once the IV trolley was gone then I could do that walk out to [the surgical building] and back and push it, so, I would, I would push it but not as hard cause I didn't know uh, didn't wanna push it too hard cause I didn't know if if uhm I should, uhm, especially cause I still had two drains in my neck P 6.</p>	
TIME	<p>Pre-surgery, hmm, I went all day long, though, that's what I do. P 1.</p> <p>--</p> <p>depends on the person, that's where all of it comes down to, right. P 2.</p> <p>--</p> <p>they would take, they would be able to say 'oh it's only fifteen minutes' if you tried to say 'you gotta do it for an hour' they'll shut down. P 2.</p> <p>--</p> <p>uhm, you have to set them [...], small goals like when we're doing that teach up and down the step, I would make it fifteen minutes for people, not thirty. P 2.</p> <p>--</p>	<p>Well, I would work as, as much as I could. P 4.</p> <p>--</p> <p>If you're doing exercise, consistency is better. P 4.</p> <p>--</p> <p>couple of [my walks] I'd go out to the [the surgical building] and back three or four times, so they were twenty minutes, half an hour. P 6.</p>	<p>Well, I think you should start out slower and increase by the time you get to the six weeks. P 1.</p> <p>--</p> <p>and now, like I said, I, you get around pretty good, I'd probably do easily a fifteen, twenty-minute workout. P 3.</p>

	<p>uhm, before surgery, uhm, probably a good half an hour a day. P 3.</p> <p>--</p> <p>Oh, pre-surgery, I think, you know, some of those walks I go on in the forest was three hours long. P 8.</p> <p>--</p> <p>So I, I would say a simple, something simple, something doable, maybe fifteen to half an hour a day, I probably could've managed. P 10.</p>		
TYPE	<p>I like to do all my exercises. P 1.</p> <p>--</p> <p>[P 2 likes to follow a structured resistance training program]</p> <p>Well, probably what I would and my figure out gonna be possibly dealing with uh, strengthening the leg cause I knew that they were gonna take whatever out of the leg and everything, so that's mainly what I was uh, thinking of is the legs, you know. P 3.</p> <p>--</p> <p>I would say simple things from your home uhm, would be achievable for everyone [...] I wish I'd had something closer to my physio stuff, so I would know where I was before and to get stronger and make those muscles move uhm before they were then you know, cut and had some range of motion issues then I knew, I would know what I could do and I what I should be doing and what I could be doing in the future. P 10.</p> <p>--</p>	<p>Oh I'd like to do the lifting and try and move my leg more and do a little walking, yeah, and core strength. P 1.</p> <p>--</p> <p>uhm, walking to the washroom, yeah, walking. P 3.</p> <p>--</p> <p>Oh, whatever. They are the specialist [referring to the type of exercise an exercise specialist could deliver in-hospital] P 4.</p> <p>--</p> <p>uhm, it's well, if it's the exercise involves laying on the ground and moving one's arms, that's not possible in-hospital. P 6.</p> <p>--</p> <p>Discussion and demo and and trial but then I could see like, going to physio afterwards maybe a visit to make sure everything is being done correctly, cause I know you can damage</p>	<p>Well, post-surgery, you wanna be do somethin' just to keep your strength up and y-you know I'd like to try and increase a little bit all the time to get back to being normal. P 1.</p> <p>--</p> <p>The post-surgery afterwards you know, is nice to have a bit of a program to follow so that y-you know my leg gets better and I'm doing the things that I should do and raisin my arms and stuff like that. P 1.</p> <p>--</p> <p>[P 2 likes to follow a structured resistance training program]</p> <p>--</p> <p>I would like to have a program. This arm is still I'm doing a little bit now [...] they give me one or two exercises and they'll see you in a month. P 4.</p> <p>--</p> <p>because uh, I like walking, I've walked all my life, I would uh like to bike when I'm not there physically yet uhm, so if there are other exercises or or ways I could get uhm, get my body back uh, faster that would be better, especially if radiation is [lip smack] uh in the books, then, get back to, s-as fit as possible before radiation starts and [...]uhm, the body sort of deteriorates during radiation and due to exhaustion. P 6.</p> <p>--</p>

	<p>uh, but certainly stretching, uhm, you know, sort of that general, just like you s-you had mentioned, like breathing or some just simple yoga, stretches or getting your sh-you know realizing where your shoulders should and what your head can do, uhm, I, I would've certainly bought-into getting my body moving before surgery, yeah. P 10.</p> <p>--</p> <p>I c-certainly could have done breathing exercises, uhm, arm raises, you know, get on the floor, do some leg stuff, like I could've certainly managed that, I don't think I woulda jumped in, you know when I was looking at what you consider high impact, I would never have gone for a run or, you know started [...] you know, like a high impact kinda workout, uh, that would not have been feasible for me, I wouldn't have bought-into that for a two-week period. P 10.</p>	<p>yourself if you do uh, exercise incorrectly. P 6.</p> <p>--</p> <p>I mean certainly walking uhm, I you know I could've, I mean those sit-to-stand squats certainly were feasible uhm, you know, th-I couldn't have gotten on the floor to do anything, that would-I don't know that I'd get back up uhm, or would want to be on the floor. P 10.</p>	<p>uh, mostly running, I think, uh I do have free weights at home, so, so I may hit weights again. P 8.</p>
LOCATION	<p>Oh, I stay home, I like that, never been much for the gym. P 1.</p> <p>--</p> <p>[P 2 preferred exercising in a gym]</p> <p>--</p> <p>I can see myself committing to doing exercises at home on my own, but I can't see myself committing to go out to somewhere and do it. P 3.</p> <p>--</p>	-	<p>I would do it in the home in more structured so that you're doing what you're supposed to do. P 1.</p> <p>--</p> <p>[P 2 preferred exercising in a gym]</p> <p>--</p> <p>I mean if I had a bike at home or whatever like, yeah, you know might do things or whatever, I'd do it at home, you know probably, I just can't see myself going out to a fitness and centre. P 3.</p> <p>--</p> <p>be at home and have someone come there to work with patient "because it's my home, this is where I live" why is better than phone</p>

	<p>Probably in a group and by myself. P 4.</p> <p>--</p> <p>I personally don't like group-based so it'd probably be better because then there's, more pressure to to push yourself harder, it's easiest, to not push yourself when you're alone in your home. P 6.</p> <p>--</p> <p>no, I would, I, I wouldn't mind that, actually, that would be good [<i>referring to one on one at home or at an exercise facility</i>] is so is uh, uh, go and get one on one uhm, just to keep me, you know one on one once a week or every two weeks or something, just uh, as a prod, a little push to make sure that I'm actually pushing, the expectation that we're gonna see them again in two weeks' time, this improvement or this change. P 6.</p> <p>--</p> <p>I would not have made the time to go somewhere. P 10.</p>		<p>counselling? "because people are lazy...and I'm one of those people" so having someone to keep you accountable "you can say whatever you want on the phone...but I won't do it". P 9. [cannot use verbatim].</p>
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4. Discussion

The purpose of this study was to obtain qualitative feedback from two key stakeholders, patients and HCPs, on adding patient assessments across the HNC surgical timeline, and the logistics and potential benefits of an exercise prehabilitation intervention. A key finding from this process was both patients and HCPs perceived assessments of PROs, physical function, and mobilization as important and acceptable across the HNC surgical timeline. Moreover, both groups value the idea of an exercise prehabilitation program. Both patients and HCPs highlighted that there is limited education and support for patients and that a cultural shift is needed, including at the policy level, to support adding exercise to standard cancer care. Finally, both patients and HCPs emphasized the importance of tailoring the future exercise prehabilitation program to the unique needs of each individual patient. This study demonstrated the importance of education, attitudes, and access to resources for successful implementation of an exercise prehabilitation program.

Our data supports other qualitative findings about the perceived benefits of exercise prehabilitation and rehabilitation in cancer care. Patients scheduled for radical cystectomies had positive attitudes towards prehabilitation for improving physical, emotional, and social outcomes [26]. Colorectal and ovarian cancer

surgical patients also found the opportunity to engage in pre-operative exercise as influential for recovery and distracting from negative thoughts [27]. Across this work, there are considerations for overall challenges to, and opportunities for, exercise implementation (e.g., ideal timing of prehabilitation components; [26-28]). In line with the present findings, Payne et al. [29] pointed to the need for education for HCPs, and a “*mindset change*” regarding the perceptions of exercise in lung cancer surgical care. This is further supported by the findings from Fong and colleagues which highlight the need for ongoing training about exercise and cancer for HCPs [30], and from Shea et al in terms of addressing both exercise implementation barriers and facilitators [31].

4.1 Implications for a Multiphasic Exercise Prehabilitation Trial

An important consideration within an exercise prehabilitation program is the FITT principle (the frequency, intensity, time, and type of exercise) and the need to tailor to patient needs and preferences. A multiphasic exercise prehabilitation program may need to focus on “*movement*”, and more limited exercise prescription during times of physical and psychosocial stress (pre and in-hospital phases). Upon recovery, exercise prescription can begin to address core exercise principles of progression and overload, in order to build fitness and functional benefits in patients, as well as continue to enhance overall well-being and quality of life. By “*starting low and progressing slow*,” interventions will be more likely to facilitate behaviour change and build a habit of regular movement and exercise in HNC patients, and thus improve recovery.

4.2 Supporting a POR Approach

Work must continue to include the voice of key stakeholders (i.e., patients, HCPs) to support the implementation of exercise prehabilitation in HNC. Over the last decade, POR approaches have emerged with efforts to improve the credibility of research and delivery of patient care [27, 32, 33]. While a gold standard for conducting POR does not exist, many agree that involving participants during multiple stages across the research continuum is a fundamental component [33], empowering the patient’s voice in the intimate decisions of their care, as well as improving the dissemination of results [34-36]. In cancer care, there is a critical need for ongoing feedback to ensure patients are receiving optimal care [37], and recognizing the patient as the “*expert*” of their own health [36]. To that end, changing clinical practice is a challenge, partially due to the evidence-practice-gap that often has a decade’s delay from research to implementation [38]. In an effort to bridge this gap, involving HCPs in the research process from design to implementation of new care practices is important to facilitate the rate at which knowledge is disseminated into practice [39]. If exercise prehabilitation is going to be integrated into HNC surgical care pathways, patients’ and HCPs’ perspectives will remain critical to ensure implementation efforts are successful.

4.3 Limitations & Future Directions

This study focused on the voice of patients and HCPs involved in the immediate care of HNC surgical patients. Although these perspectives are critical, involving other key stakeholders, such as administrative personnel and family/caregivers, would provide a more comprehensive understanding of exercise implementation within HNC surgical care [40, 41]. For example, understanding the barriers and facilitators to exercise implementation from administrative and policy levels will support integration into clinical practice. As mentioned by one of the reconstructive surgeons involved in patient care: “*I suspect there’s a whole bunch of*

negative perceptions around uhm, encouraging cancer patients to do exercise, so, I'm sure there's some work that could be done on branding and marketing to make it [...] kind of a standard that both as health care professionals, administrators, uhm, you know, people financing the whole thing, tax payers, which is the public, see the importance of it".

While we attained rich data from the interviews that were conducted for this study, our plan was to interview more members of the clinical team, including physiatrists, unit nurses involved in the direct care of HNC surgical patients, and rehabilitation specialists. Unfortunately, due to the COVID-19 pandemic, and HCPs required on the frontlines of health care, we concluded our interviews early. COVID-19 restrictions in Alberta took effect early March 2020, and we had planned to continue interviews into April. While additional opinions would have been valuable, we believe we captured a representative view of HCP perspectives, with consistency emerging across interviews from those conducted. Further, the in-hospital interview was only completed by one patient, indicating that this may be too early during the patient's recovery to conduct an interview. Participation was excellent at the follow-up assessment point, further supporting that delaying feedback until recovery is underway may be critical for ensuring the ability of patients to engage with the research team.

Finally, although this study included the patient voice for feedback on assessments done to date, and the development of a future program, future work should also aim to include patients as partners earlier in the research process. One means of achieving this is through a patient advisory board [42], or patients as collaborators in the conceptualization of studies. This may be beneficial for both the patients and the research team [43], allowing patients to feel “*empowered*” in the design and implementation of an exercise prehabilitation program in HNC surgical care, and supporting favourable outcomes for dissemination of findings and increased attrition [33].

5. Conclusions

Our findings highlight the importance and value of exercise across the HNC surgical timeline, from both the patients' and HCPs' perspective. Patients and HCPs found patient assessments to be acceptable and necessary across the surgical timeline and provided feedback on the design of an exercise prehabilitation intervention. Our findings will be used to support the addition of exercise to the care pathway for HNC surgical patients.

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