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er, i e o e head ha ne ing in man ca e, 2 o mo e, he a i, o omo e o e e ing do age, co ec kinema ic, main ain o, e and balance, and, o man all a i, nk, hi, and leg d ing e ing. I i co, l in bo h e onnel and e, i men.^{3,5} In ecen ea, lo e limb obo ic e o ke le on ha e eme ged a a o enial o e g o nd loco mo o aining ool fo indi al i h ne ologic condi ion. The o ide, he in en i and do e ma ching, anda d of ca e, b, al o o ide, loading and, c, ed kinema ic i hich m l i le clinician offe. Al ho gh, he facili a e fa o able heal h o, come fo, e, he ma ed ce clinician effo, d ing, he a^{4,6-9}

Va io o gani a ion and in e iga o n he i e cien ic e idence and o ide ecommenda ion, i hich in, ence clinician' e ce ion abo, loco mo o o gai, aining.¹⁰⁻¹⁴ Thei e ce ion a e al o in, enced b, hei a ce e ing, geog a hic loca ion, aining, and know ledge. The, e of obo ic e o ke le on allo, o e g o nd loco mo o aining fo indi al i h SCI i h a ing deg ee of im ai men, a an ea l age of ehabili a ion i hen, ad i onal me hod of loco mo o aining a e di c l. F, he mo e, he e de ice allo, indi al i h SCI o a ce i e i hich in, he comm ni, enhancing con i i of ca e.⁴

Al ho gh, he e i ea l e idence o, o, he heal h bene of obo ic loco mo o e o ke le on, e,^{7,15-19} he e i limi ed e ea ch on clinician' e e ce i e ega ding a lica ion fo e o ke le on, e in loco mo o aining. Thi, d aim, o de cibe clinician' e fe ence, clinical a ce i, aining, a e gie, and clinical deci ion on ho, obo ic e o ke le on de ice a e, ed i h e e an and ci ilian i h SCI.

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Ad ancemen in clinical a ce i de end on a c clic o ce i h e e e idence i in e ga ed in o a ce i and i h e e clinical e e e idence info m, he e idence.²⁰ Fo hi ea on, clinician e e ce i e e la ed o bene, and limi a ion of ehabili a ion echnologie a e im o, an. Heinemann e al²¹ e amined, he a i, e e idence, ing obo ic e o ke le on fo o e g o nd i hich in foc, g o. The a i, de cibe d, hei e e idence, e al a ion, and aining a e gie i h obo ic e o ke le on. Pa i ci an, e o ed, ing e o ke le on ima il in o, a ien, and i h e e ing, ho gh l cen e, ed e o ke le on d ing in a ien, ehabili a ion. A, ical o, a ien, e i ode con i, ed of 20-30 e ion and in ol ed a lea, 2 a ff membe. T ea men goal incl ded, anding, e ing, and gai, aining. Bene, a, ib, ed, o, e of e o ke le on incl ded h i ological (ed ced ain, im o ed bo, el f nc ion), chological, and ocial change. The a i, no ed, he i k of fall, kin i i a ion, and high a ien e e ce a ion. Ho i al, ed a ied, a e gie fo in e ga ing obo ic e o ke le on in o, he a e ice.

Al ho gh, he Heinemann, d o ide elimina e idence o g ide, he in e ga ion of e o ke le on in o ehabili a ion e ice, a mo e de ailed anal i of he a i, e e idence i needed o g ide a ce i and o info m a ien e e ce a ion. Thi, d add e e e ea ch, e ion: (1) Ho, do clinician e al a e a o ia ene, a ien cha a ce i ic, and eali ic e e ce a ion

e ga ding obo ic loco mo o e o ke le on, he a in ehabili a ion and comm ni, e ing? (2) Wha, aining, a e gie do clinician, e i h a ien, and ca e gie e? (3) Wha, bene, do clinician e ce i e f om, ing e o ke le on? (4) Wha, e fe ence do clinician ha e e ga ding i hich obo ic e o ke le on, he, e? (5) Wha, limi a ion, o obo ic loco mo o e o ke le on do clinician iden i f, and i h a ha d, a e and of i h a e de elo men, do clinician e commend?

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In i, i onal e i e, boa d a collabo a ing o gani a ion o ided e hical a o al. All a i ci an, o ided info med con en, and e ce i ed an hono a i m. The U.S. A m Medical Re ea ch and De elo men, Command Of ce of Re ea ch P o ce ion, H man Re ea ch P o ce ion Of ce al o a o ed, he o col.

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Table 1 Clinicians' demographic and robotic exoskeleton experience

Demographic Characteristics	Site A	Site B	Site C	Site D	All Sites
n	10	9	8	2	29
Mean age (y)	34	37	36	32	35
Age (y) (range)	26-44	32-47	30-45	30-34	26-47
SCI clinical experience (y) (mean)	5.8	9	8.6	6.5	7.6
SCI clinical experience (y) (range)	1-12	4-13	2-22	4-9	1-22
Exoskeleton experience (y) (mean)	3.7	3.9	4.1	3.5	3.0
Exoskeleton experience (y) (range)	1-11	2-6	2-7	2-5	1-11
Sex (%)					
Women	70	67	88	100	76
Race/ethnicity (%)					
White	90	100	88	100	93
Black	0	0	0	0	0
Asian/Indian	0	0	0	0	0
>1	0	0	13	0	3
Other	10	0	0	0	3
Declined to answer	0	0	0	0	0
Hispanic/Latinx (%)					
Yes	10	11	13	50	14
Exoskeleton experience type (%)					
Research	50	0	25	0	24
Clinical	0	66	50	100	38
Research and clinical	50	44	25	0	38

clarifying, and in emerging data in code and theme, and then emerging and identifying data by 3 research team members. We used an inductive analytical approach to develop the codebook based on our coding of the focus groups in the interviews. The research team iterated the coded and uncoded data in the iteration, reconcile discrepancies among the 3 codes, discuss initial findings, and make modifications. Different teams of 3 researchers coded the remaining data. Two teams coded independently and then reconciled differences. The third team read the data independently and reconciled the two teams' themes. When kappa coefficient did not meet or exceed 0.80, the team of 3 members iterated and modified them for each content, and then in the acceptable reliability. Finally, the entire team met to iterate and harmonize the codes across the thematic analysis of the 4 focus groups and the iterative analysis.

We enhanced methodological rigor by using a standardized, semi-structured moderator guide and having 1 moderator conduct all focus groups. We entered in the data using a triangulation by having 3 independent coders and an iterative process before reconciling themes.

Table 1 Demographic characteristics of focus group participants. On average, clinician were in their 30s, predominantly women and white. Experience with SCI ranged from 1 to 22 years, with average experience with exoskeletons ranged from 1 to 11 years. Participants had clinical and/or research experience.

Table 2 Overview of clinician's robotic exoskeleton training. One-third to one-half of the clinician had attained certification with a minimum of 20 hours of training. Most clinicians had previous experience with robotic locomotor training and had robotic locomotor training experience with the exoskeleton had greater comfort using the device with a broader range of individual than did clinician with less experience.

certification with a minimum of 20 hours of training. Most clinicians had previous experience with robotic locomotor training and had robotic locomotor training experience with the exoskeleton had greater comfort using the device with a broader range of individual than did clinician with less experience.

Clinician who reported more experience using robotic exoskeleton had greater comfort using the device with a broader range of individual than did clinician with less experience.

Table 2 Overview of clinician's robotic exoskeleton training.

Researcher identified themes in the data, and the researcher of the focus groups guide and the analysis of focus groups members' statements. Table 3 identified 11 themes from inductive coding of data, along with the number of codes. The first column in Table 3 lists the high-level theme, the second column lists the mid-level theme, and the third column lists the theme. Shown in parentheses are the number of times occurrence of theme when the researcher noted, number of occurrence of mid-level and theme. Figure 1 provides a graphical view of theme, mid-level theme, and theme frequency, with frequency of each emerging relationship.

Table 3 Overview of clinician's robotic exoskeleton training.

Clinician were concerned about availability of exoskeleton for use, training, and the availability of exoskeleton. A primary concern was based on inclusion-exclusion criteria established by the device manufacturer, a primary goal for using the device, time since injury, and the level of injury.

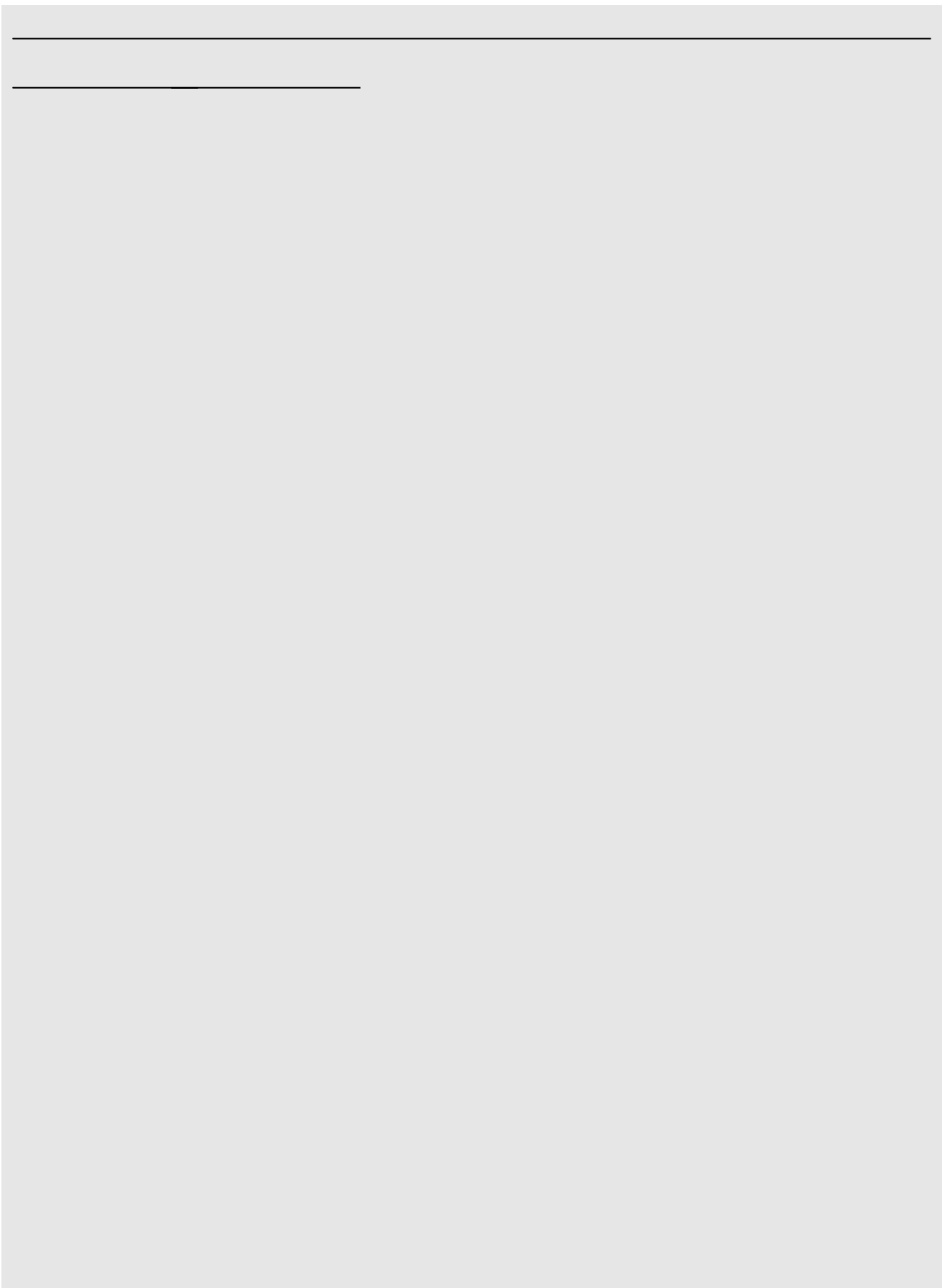
Well, I think that's individual and someone has recommended and he made all the decisions because he just has his own, all the decisions, making an exoskeleton, but he's only one of, or know, using it, I think he's the clinician, if that's only

Table 3 (continued)

High-Level Theme (Frequency)	Mid-Level Theme (Frequency)	Subtheme (Frequency)	Representative Quotes
Patient experience	Physical (24)		<p>And so I think the – being able to walk overground with individuals who might not necessarily be able to do that without a significant amount of assistance I think is extremely valuable.</p> <p>I think of all the other health benefits, too, that again it's not well documented at this point, but that's one thing that being upright and walking gives you bowel/bladder, spasticity, as people mentioned, a lot of different health benefits that you can't get another way I think is something to consider, especially with, you know, taking it home, like, that might be the biggest benefit to taking it home in the long term is just from a health and wellness perspective versus a functional perspective, at least where it is at this point.</p>
	Realistic expectations (62)		<p>Whether they have true understanding about the capabilities of—the real capabilities of exoskeletons, what they can and what they cannot do, that is where a lot of the conversations really have to happen, not going and seeing these cool marketing spots online and not hearing these really emotional, impressive stories from patients who have utilized them online but getting to the nitty-gritty of, well, this is where you are and these are your goals and this is the reality for you.</p> <p>And he said, well, my workers' comp offered to buy me an exoskeleton or a standing outdoor wheelchair, and he's like, I like to go hunting. I picked the standing outdoor wheelchair. He's like, I'm not – you know, as cool as this thing is, he's like, this doesn't give me what I want as far as my life and the things that I want to be able to do. And so that was kind of like an aha, like this guy's been in it and does great and loves it, but he's like, I don't want that.</p> <p>There's a very fine line between encouraging someone and telling them why you're doing it and having them run off with oh I'm doing this because I'm going to walk. And it would be nice if every single person that we saw every day would have that opportunity, but not</p>

▼ e 3 (continued)

High-Level Theme (Frequency)	Mid-Level Theme (Frequency)	Subtheme (Frequency)	Representative Quotes
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▼ e 3 (continued)

High-Level Theme (Frequency)	Mid-Level Theme (Frequency)	Subtheme (Frequency)	Representative Quotes
Therapist experience	Benefits (28)		<p>If a limiting factor in walking someone is the clinician's ability to continue to sustain the activity and not the ability of the patient to sustain the activity, then that's a huge limiting factor to the total volume that you can actually get in in a session so I think that's a great point because we can get a lot more steps in with a device that's going to help facilitate those steps than if we're manually manipulating every step.</p> <p>So that's also where inpatient, sometimes it's easier to get them into a robotic system than to have the necessary four people it would take to truly do a treadmill session.</p> <p>But the biggest barrier is probably wounds, if they already have wounds, and the weight limit is 220.</p> <p>But I think one limiting thing with EKSO is that we usually always have two therapists in case something bad happens, it's a little harder to get out.</p>
	Limitations (19)		
Training	Caregiver (31)		<p>That's a perfect person, but you also have to have the perfect support person.</p> <p>And so far the caregivers that our patient have chosen, like one of them was a son who, I don't know how old he was, adult son that learned the device to be his second person or a wife, um, they've all been super supportive and learned the devices right along with the patient, and come to sessions. So I think that's really facilitated their success as well.</p> <p>I mean, obviously they have to be physically capable of it.</p>
	Patient (40)		<p>And, oh, my goodness I had one person from North Carolina figure out that whole motor neuron thing, he figured out how to use the device, Level 2 training, meaning community mobility, not just in the home within the first 2 days, completely independent. He took it to a school. He took it to a funeral. We did everything imaginable. We were on a light rail, that's never been done on an exoskeleton. Like it was easier – like a true community ambulator in the device.</p> <p>So it's like trying to show them what the benefits are, because we sort of know as therapists how to guide them, but sometimes they're not really sure what they're going to get out of the trials. And so it's sort of enlightening to them</p>

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