



Knowledge, applicability, risks and potentials of AR / VR in the field of physiotherapy in Austria: results of an online survey

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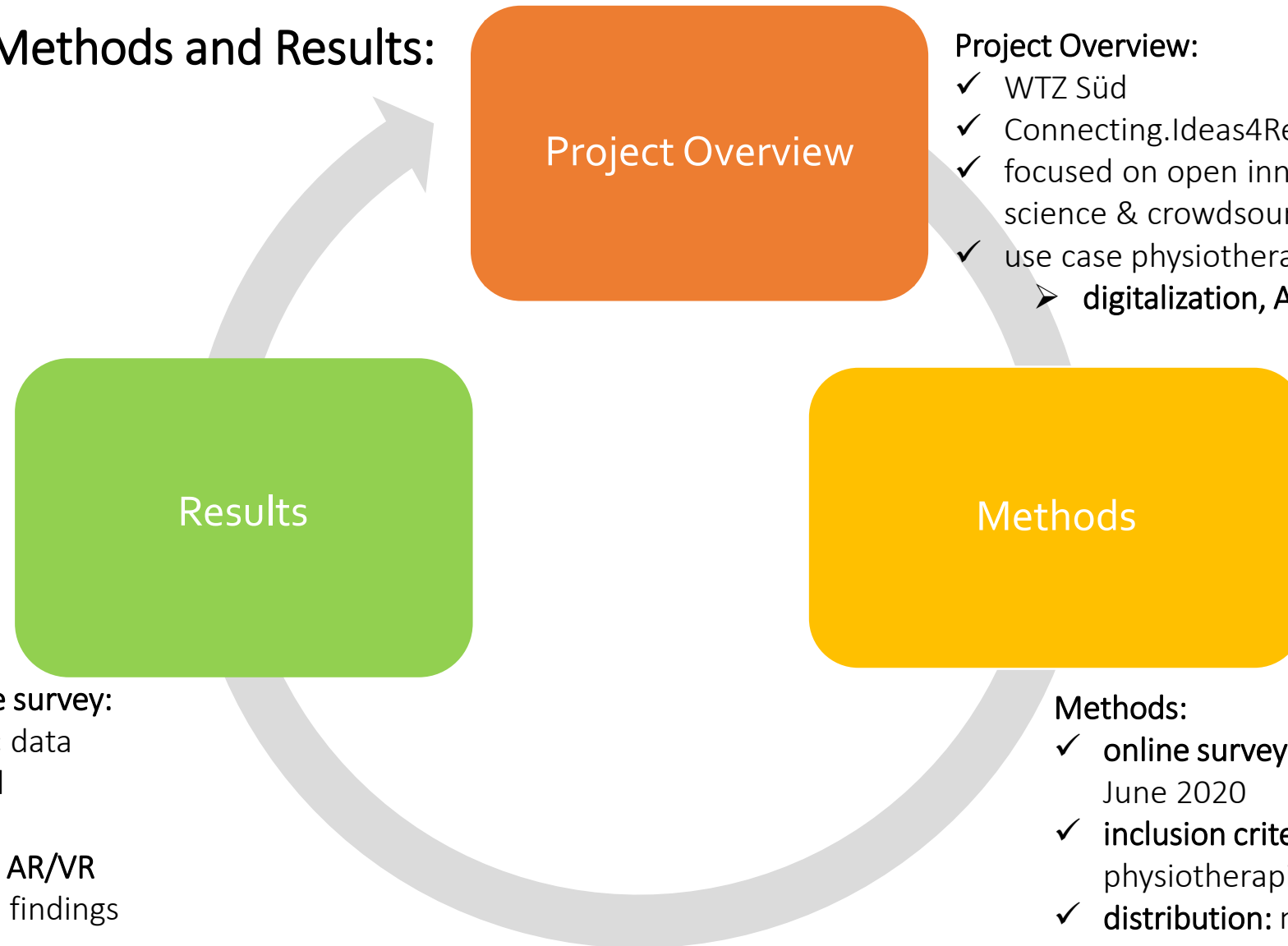
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...Introduction:

- ✓ Augmented Reality (AR) in physiotherapy yielded positive effects, such as increasing balance, velocity, cadence, step length, stride length or efficacy to handle falls (Yoo et al., 2013). Chi et al. (2019) showed that different types of Virtual Reality (VR)- therapy could reduce neuropathic pain associated with spinal cord injuries , but the clinical significance of this analgesic effect seems unclear.
- ✓ There are **15,947 registered physiotherapists** in Austria (Holzweber et al., 2021).
- ✓ The Austrian profile of competences for physiotherapists is composed of seven roles and based on the CanMEDS 2015 Physician Competency Framework (Frank, Snell & Sherbino, 2015).
 - To fulfill the **specific role of an innovator/scholar**, physiotherapists need to live and practice lifelong learning processes and they are required to develop and disseminate evidence-based knowledge (Becker, 2019; Eckler et al., 2017).
 - Our research project “Connecting.Ideas4Research” in general, analyzes crowdsourcing processes in different professions.
 - Our use case in physiotherapy in particular, analyzes and searches for potentials and barriers in the field of digitalization and AR among Austrian physiotherapists.



...Project Overview, Methods and Results:



Project Overview:

- ✓ WTZ Süd
- ✓ Connecting.Ideas4Research
- ✓ focused on open innovation science & crowdsourcing processes
- ✓ use case physiotherapy:
 - digitalization, AR & VR

Project Overview

Methods

Main categories of the survey:

- ✓ sociodemographic data
- ✓ physiotherapy and digitalization
- ✓ **physiotherapy and AR/VR**
- ✓ access to research findings
- ✓ COVID-19-crisis

Methods:

- ✓ **online survey:** LimeSurvey, May and June 2020
- ✓ **inclusion criteria:** all registered physiotherapists in Austria
- ✓ **distribution:** newsletter of the professional organisation, Facebook, graduates, personal emails

... Sociodemographic Results:

- ✓ overall sample n=197
- ✓ excluded participants: n=80
 - ✓ unfulfilled inclusion criteria: n=5
 - ✓ unfinished questionnaires: n=75 ▲
- **analyzed sample: n=117 (w=77.8 %; m=22.2 %)**

age & experience:

n = 117	Minimum	Maximum	Mean	SD
★ Age (years)	20	60	37,56	10,66
Post-qualification experience (years)	1	40	14,52	11,10

educated at:

n = 117	n=	%
PT-School	13	11,1 %
PT-Academy	41	35,0 %
University of applied sciences	61	52,1 %
University	2	1,7 %

working conditions:

n = 117	n=	%
Employed	50	42,7 %
Self-employed	34	29,1 %
★ Both	29	24,8 %
On unpaid leave	4	3,4 %

▲ probably due to the length of the questionnaire

★ = similarity with Holzweber et al. (2021) - annual report of the Austrian Health Register

... Results:

- **58.9 %** (n=69) do not know the term AR
- A mean of **4.63 (± 2.09)** indicated the **relevance of AR** on a scale from 1 (not relevant) to 10 (absolute relevant)
- **70.9 %** (n= 83) **cannot really identify advantages of AR** in physiotherapy

Potential Benefits:

- increased motivation due to gaming aspects
- development of new therapeutic approaches

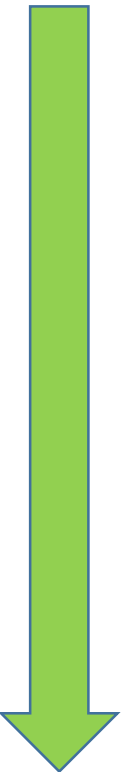
Potential disadvantages:

- increased costs
- a reduction of face to face contacts
- increased risk to fall

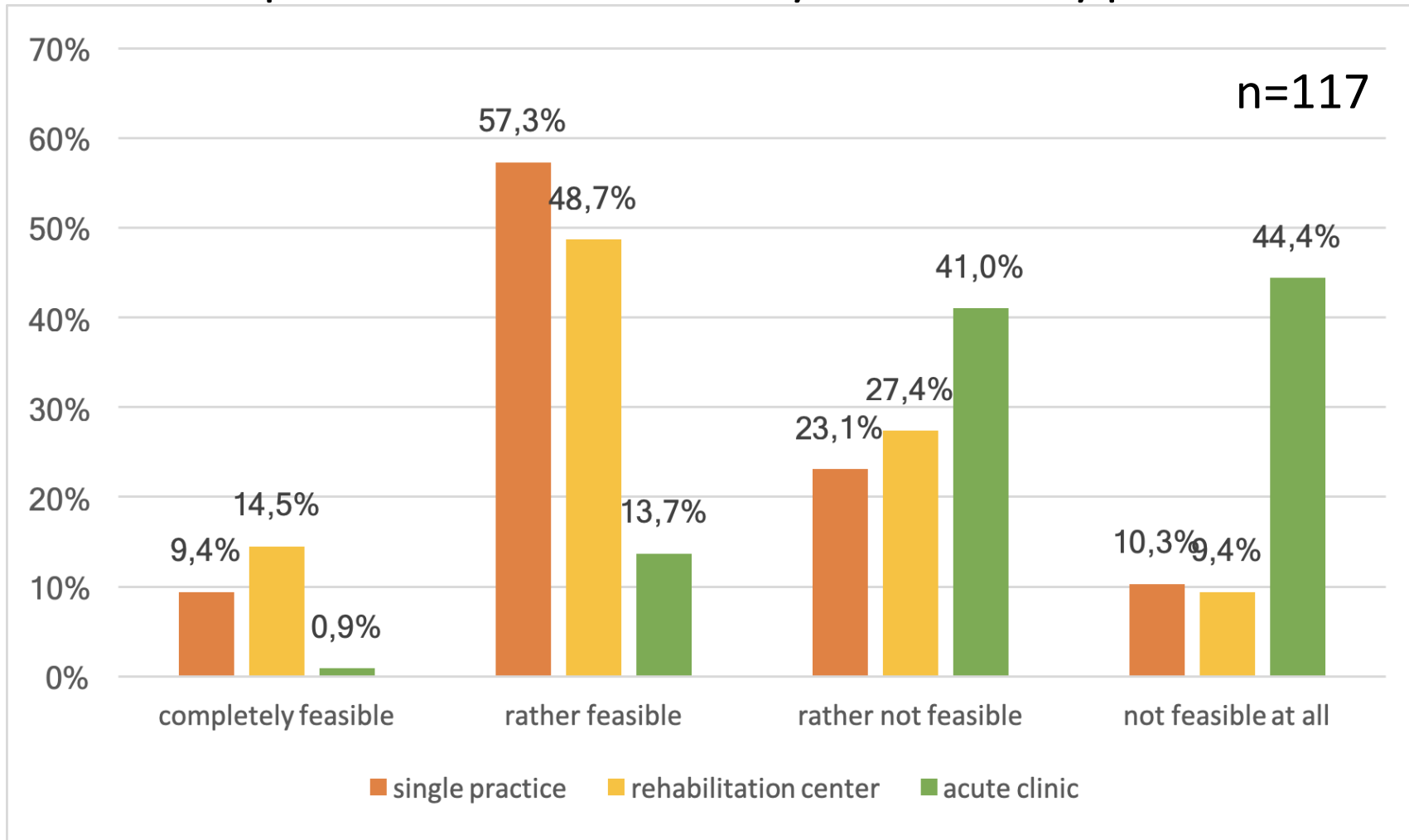
Further research is required: 83.8 % (n=98)

Identified interesting research topics :

- 🔍 the effect of AR on patients' **adherence or compliance** (n=6)
- 🔍 AR for **diagnostics** and therapy evaluation (n=6)
- 🔍 possible applications of AR in physiotherapy **for specific pathologies** (n=10)



... Example 1: results for feasibility of AR in daily practice

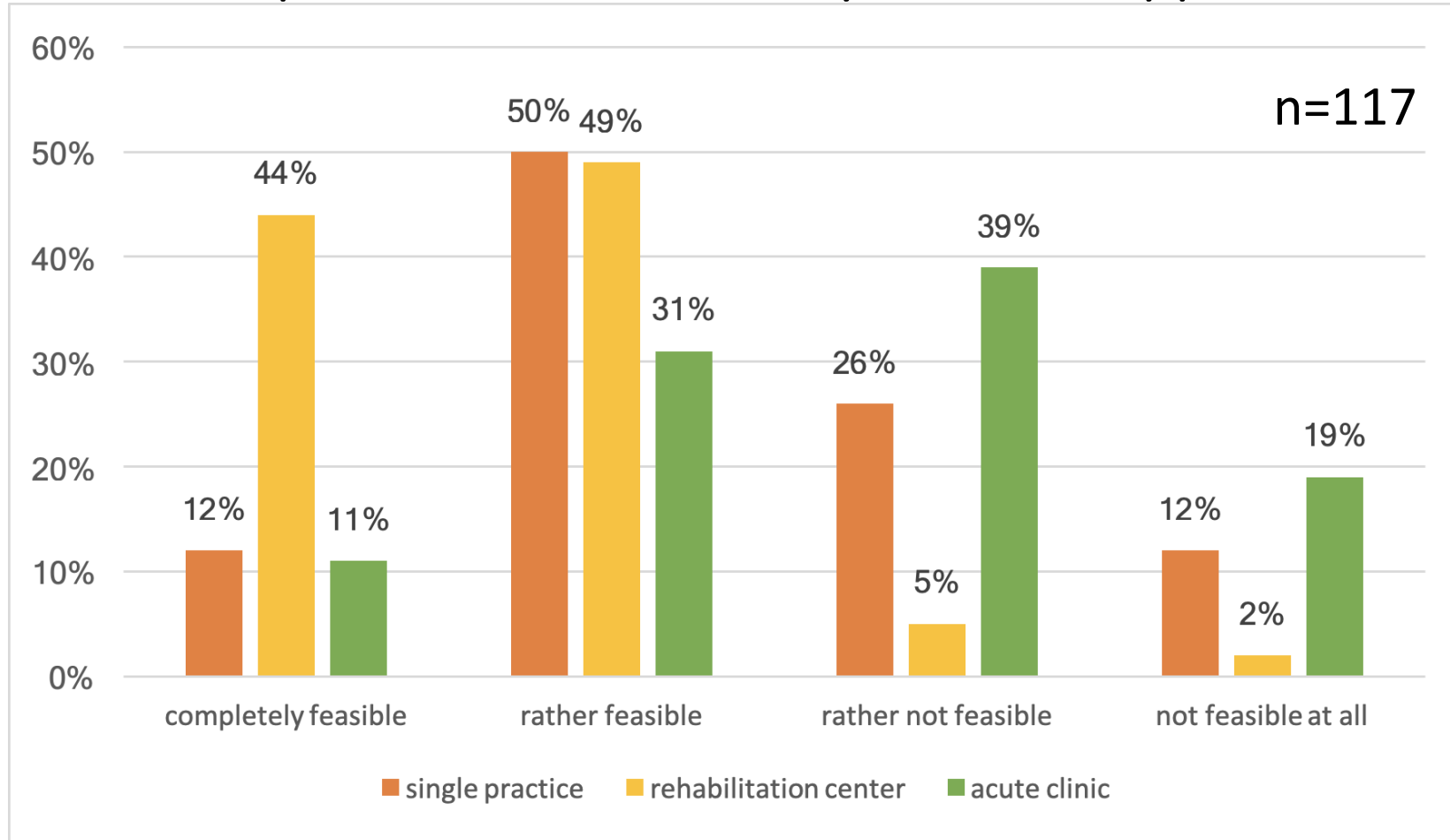


- Possible explanations:
- predominant characteristics of patients
 - different goals among settings
 - applicability in musculoskeletal and neurological fields vs. other fields

...feasibility of VR-glasses

(e.g., for supporting patients during home exercise programs with further information and real time feedback)

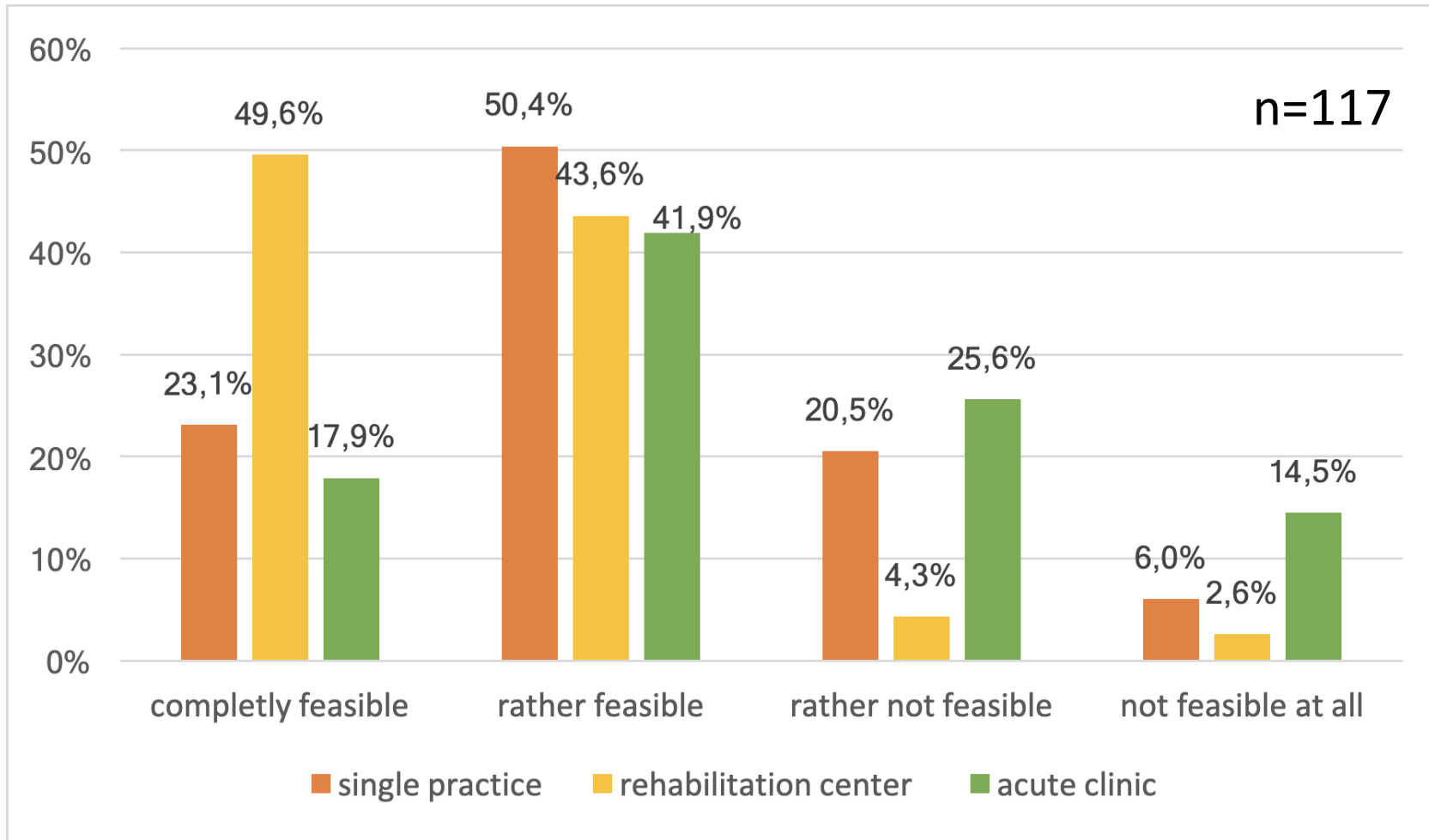
... Example 2: results for feasibility of AR in daily practice



- Possible explanations:
- different goals among settings
 - availability of necessary equipment
 - frequency of working on gait parameters directly

...feasibility of laser projections on the ground in gait analyses
(e.g., foot prints on treadmills to influence step length and/or velocity)

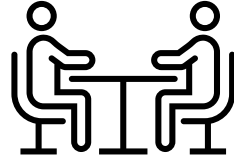
... Example 3: results for feasibility of AR in daily practice



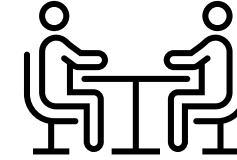
- Possible explanations:
- easy handling
 - AR „integrated“ in an everyday object
 - different patient needs

...feasibility of anti freezing canes

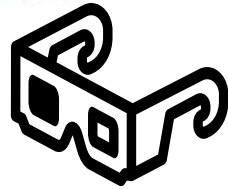
(e.g., laser projections on the floor helping people with Parkinsons' diseases overcoming the freezing phenomenon)



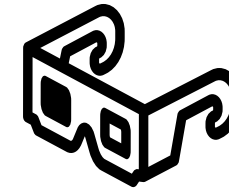
... Discussion:



- **Representativeness of the sample size:** comparison with the population of Austrian physiotherapists (Holzweber et al., 2021):
 - ✓ **age:** mean age is comparable
 - ✓ **education status:** not representative
 - ✓ **working conditions:** not representative (except for the group of physiotherapists who are employed and self-employed)
- **Limitations:** small sample size, diversity of sociodemographic characteristics, reliability questionable, difficulties contacting participants
- **Possible solutions:** create legal regulations so that the professional register can be used for distribution



... Conclusion & Perspectives:



Regarding on our results Austrian physiotherapists who filled out the survey

- have a **lack of knowledge** regarding AR/VR
- see **advantages and disadvantages** using this technology

Although the sample size is not representative, similar concerns about AR were concluded as did Banasiadi et al. (2020):

- ✓ **special knowledge and education is needed before using these tools**
- ✓ the **therapeutic setting** and **patients' pathologies** could influence physiotherapists' decision if they used AR-systems in their daily practice
- ✓ **further research** is required to analyze the effects of AR/VR in healthcare and especially in the field of physiotherapy

- Baniasadi, T., Ayyoubzadeh, S. M., Mohammadzadeh, N. (2020). Challenges and Practical Considerations in Applying Virtual Reality in Medical Education and Treatment. *Oman Med J*, 35(3), e125. doi: [10.5001/omj.2020.43](https://doi.org/10.5001/omj.2020.43)
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