**Health problem**
- Musculoskeletal disorders are the second most common cause of disability worldwide
- Knee injuries account for 40% of all musculoskeletal injuries
- 40-50% never fully recover leading to chronic conditions

**Treatment**
- Physiotherapists often administer multiple modalities within a single treatment session
- Information provision and exercise are used heavily in knee rehabilitation
- Most time is spent providing advice and information to patients
- A general trend of moving toward self-management of knee conditions
- Most patients will be self-managing their conditions outside of physiotherapy departments
- Information needs to be provided remotely

**Taxonomy of Rehabilitation of Knee Conditions (TRAK)**
- TRAK was developed as a formal ontology of rehabilitation concepts and modalities
- TRAK is based on current research evidence and expert clinical opinion
- TRAK supports clear communication among clinicians and patients
- TRAK stores knowledge about knee rehabilitation in a machine-readable form
- TRAK can support automated processing of information in this domain, e.g.
  Spasić et al. (2015) KneeTex: An ontology-driven system for information extraction from MRI reports. Journal of Biomedical Semantics, Vol. 6, 34

**Question answering (QA)**
- Frequently asked questions (FAQs) are those commonly asked in a given context
- FAQs come together with ready-made answers
- QA aims to provide an answer to a natural language query
- QA systems can further facilitate access to information
- KneeQApp is a QA system that supports knee patient information needs

**Methods**
- 342 FAQs across 12 knee conditions collected from the Web
- FAQs stored in a database
- TRAK provides a vocabulary of domain-specific terms and relationships among them, e.g.
  - ACL is a synonym of anterior cruciate ligament
  - both ACL and PCL are cruciate ligaments
- TRAK ontology supports interpretation of user questions
- Approximate string matching is used to compare user questions against FAQs
- The answer to the most similar FAQ is presented to the user
- We compared the performance of different string similarity metrics: cosine, Jaccard, Jaro-Winkler, Levenshtein, Monge-Elkan, Smith-Waterman

**Results**
- 48 user questions spanning twelve major knee care topics
- 36 can be answered appropriately and 12 cannot
- Recall = percentage of questions for which the system returns a correct answer where one exists
- Rejection = percentage of questions that the system correctly reports as being unanswerable
- The best recall is almost 70% using Jaccard and rejection threshold 0.0, but rejection is 0%
- The best rejection is 100% using Levenshtein and rejection threshold 0.8, but recall is around 30%
- The best combined recall and rejection is 60% and 40% respectively using Jaccard or cosine and rejection threshold 0.5
- More effective than keyword-based retrieval used in, e.g. phpMyFAQ

**Conclusions**
- KneeQApp is a QA system in the knee rehabilitation domain
- KneeQApp supports self-management of knee conditions
- KneeQApp utilizes knowledge from the TRAK ontology
- KneeQApp outperforms an agnostic FAQ system
- In future work, user feedback will be used to support learning from experience

**References**