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# **Mobile Technology: Maximizing Use in Clinical Practice**

### Dawn T Gulick, PhD, PT, ATC, CSCS

- Professor Widener University
- Private practice owner
- US Olympic Sports Medicine Society Member
- Author of Ortho Notes, Screening Notes, Sport Notes, Mobilization Notes, & > 100 publications & presentations
- Developer of iOrtho+ Mobile App



### **Disclosure**

• Developer of mobile app iOrtho+®



Owner of company Therapeutic Articulations LLC

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## **Objectives**

- Identify at least three criteria used to assess the quality of a mobile app
- Describe at least two differences between qualities of mobile apps vs textbooks
- Identify at least 3 mobile apps that may be useful in your clinical practice



### **Advances in Mobile Technology**

Mobile health boom began in 2009

Smart phone within arms reach = 19 hours per day

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### Simple Stats.....

### As of October 2014:

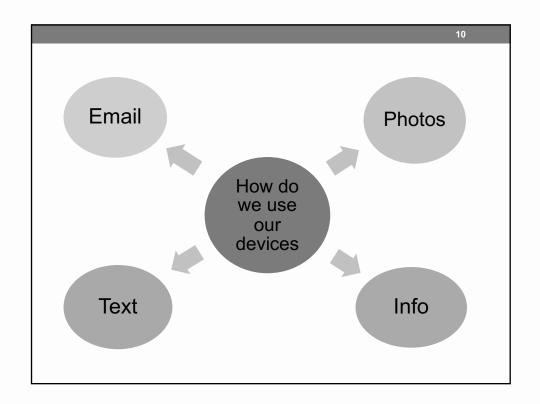
- 64% of American adults own a smartphone
- 90% of American adults own a cell phone
- · 32% of American adults own an e-reader
- 42% of American adults own a tablet computer
- 67% of cell owners find themselves checking their phone for messages, alerts, or calls — even when they don't notice their phone ringing or vibrating.
- 44% of cell owners have slept with their phone next to their bed because they wanted to make sure they didn't miss any calls, text messages, or other updates during the night.
- 29% of cell owners describe their cell phone as "something they can't imagine living without."



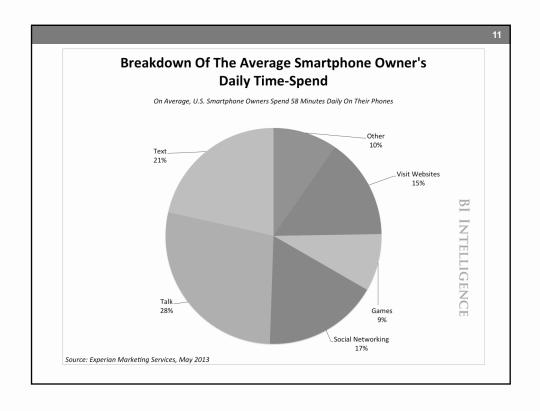
# In March 2014, the *Journal of Bone & Joint Surgery* reported:

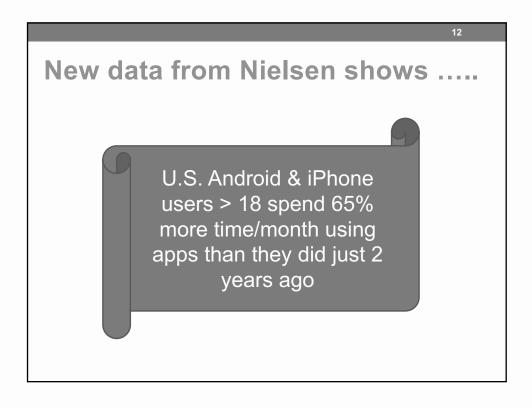
- 76% of residents use medical apps on their phones, and it is expected that will increase over the next 2 years.
- Over half of orthopedic residents predict that they will rely heavily on mobile apps to obtain clinical orthopedic information in the future.
- As the next generation of technology-oriented surgeons progress through training and begin practicing, it appears inevitable that app popularity and desirability will only grow

Waldmann & Weckbecker, 2013; Singler, Roth, Beck, Cunningham & Gosch, 2016







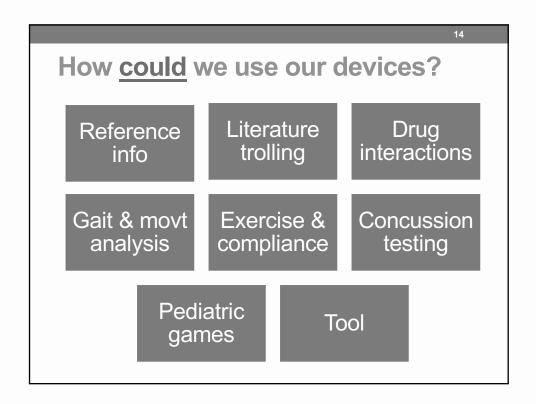




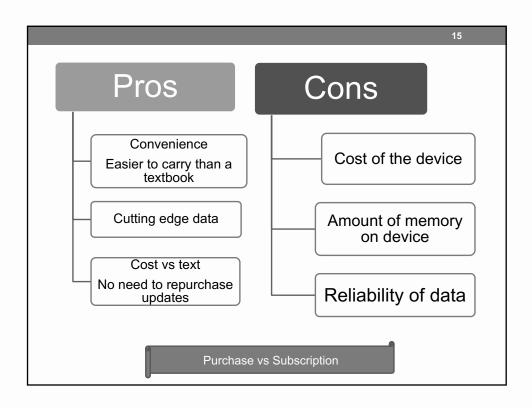
### In Q4 2013 Americans.....

- spent 30 hours, 15 minutes using apps, a full half-day more than 18 hours, 18 minutes in Q4 2011.
- average number of apps used per month, however, only increased slightly from 23.2 in Q4 2011 to 26.5 during the same period in 2012 & 26.8 apps/month in Q4 2013.
- this shows that while there may be an upper limit to the total number of apps users are willing to access within a given month, the amount of time they are spending on those apps is showing no signs of slowing down.

Nielson, 2015



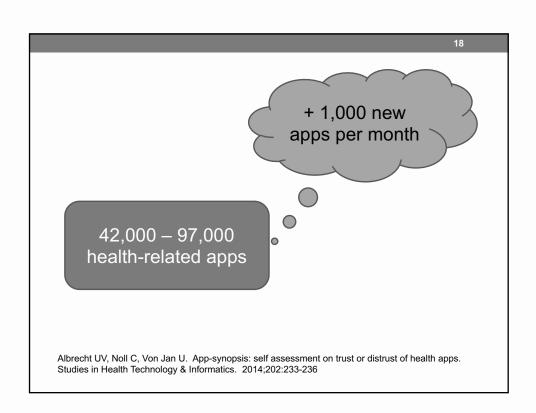




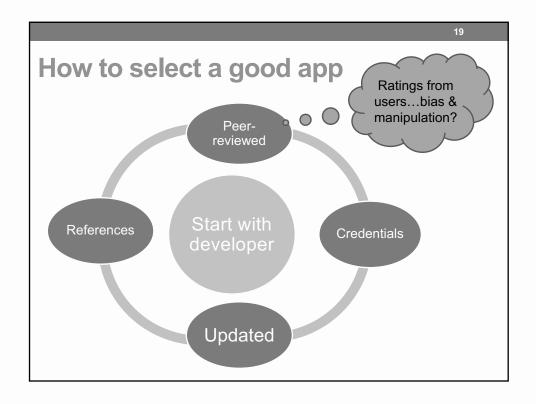
Platforms



- Android overtook Apple's iOS app store to lead in number of downloaded apps.
- With 44% share vs. Apple's 31%, Android users are now downloading more mobile programs than iPhone and iPad users combined.
- This is despite the Android Market only having 319,161 apps at the end of last month vs. the Apple App Store's 459,589.







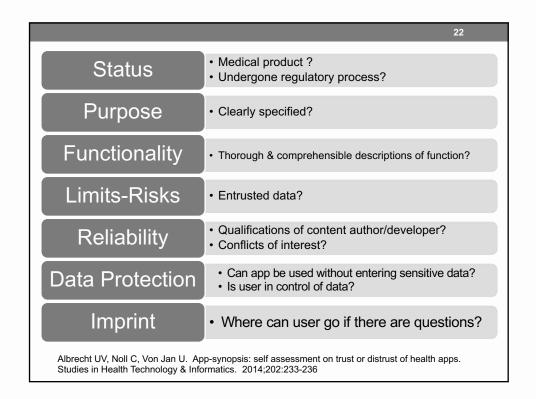
- Mobile devices and the apps running on them have become an integral part of daily life & this also includes the areas of medicine & health.
- Target audiences include those interested in their health, patients, & professional users.
- The sheer number of available apps makes it hard for users to decide whether an app they are interested in is trustable or not.
- A decision should be based on a careful analysis of the available information.

Albrecht UV, Noll C, Von Jan U. App-synopsis: self assessment on trust or distrust of health apps. Studies in Health Technology & Informatics. 2014;202:233-236

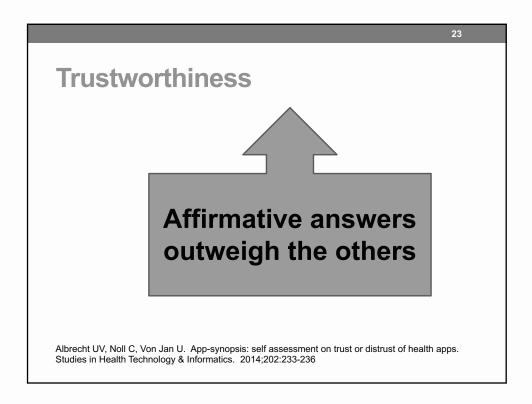


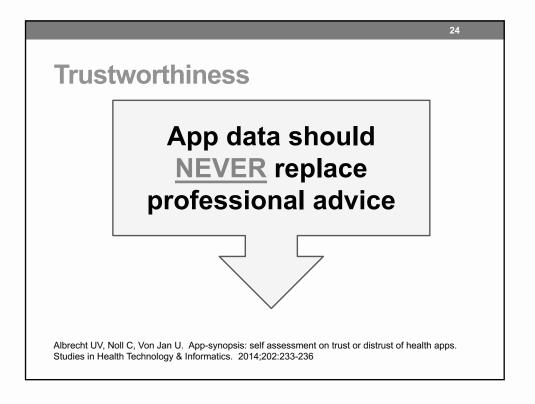
 In order to provide them with a guideline on how to perform their evaluations, we propose a checklist covering the most important aspects for deciding whether an app can be entrusted with information that - especially when it comes to personal, health related information - is usually of a highly sensitive nature.

Albrecht UV, Noll C, Von Jan U. App-synopsis: self assessment on trust or distrust of health apps. Studies in Health Technology & Informatics. 2014;202:233-236











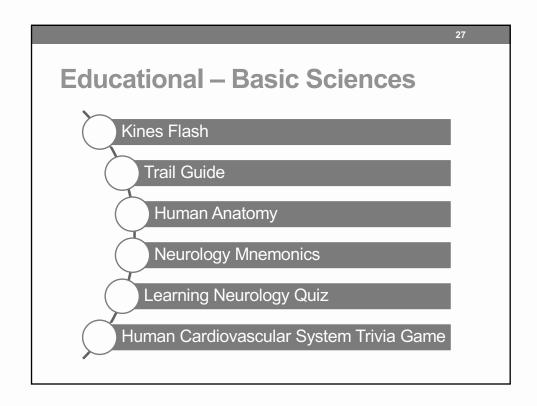
Is a smartphone a medical device?

This question becomes complicated when an application not specifically designed as a medical application is used for therapeutic purposes

Russell TG, Jones AF. Implications of regulatory requirements for smartphones, gaming consoles & other devices. Journal of Physiotherapy. 2011;57 Vol. 57(1):5-7

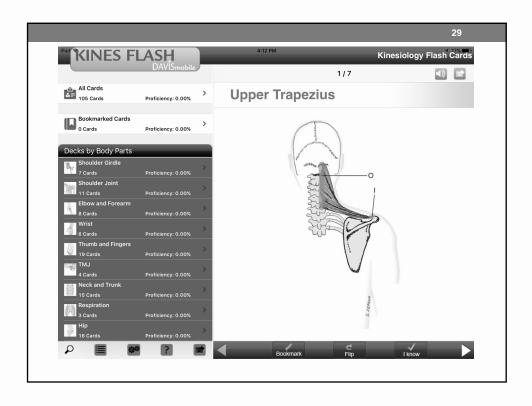
# Categories of Apps Educational Basic sciences Clinical resources Tools & assessments Patient treatment & education

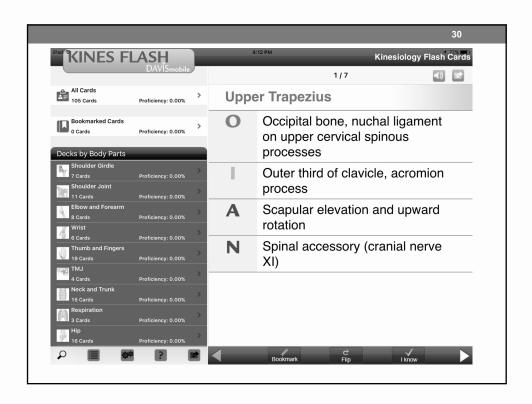






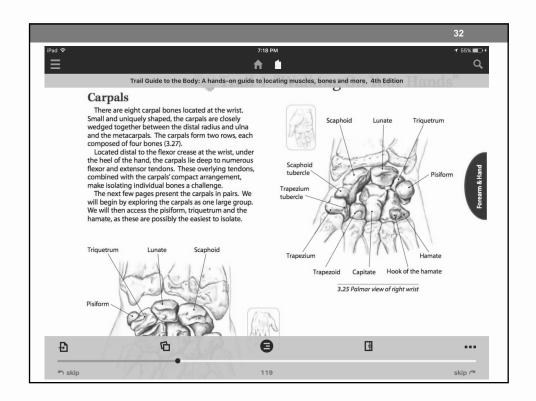




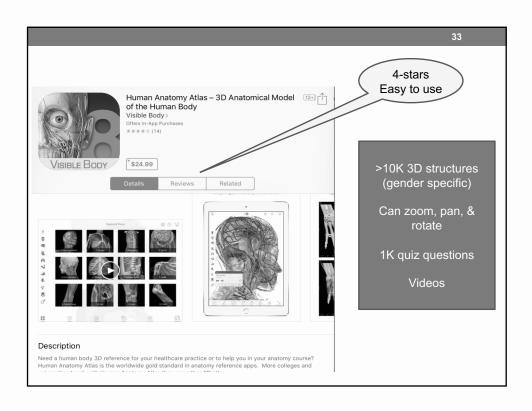


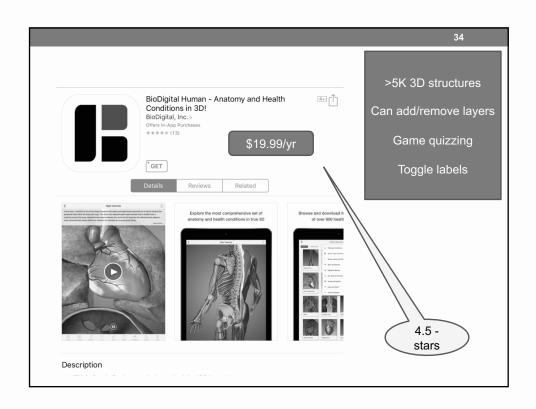




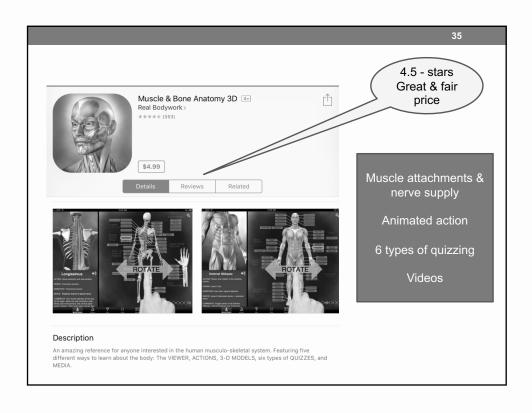


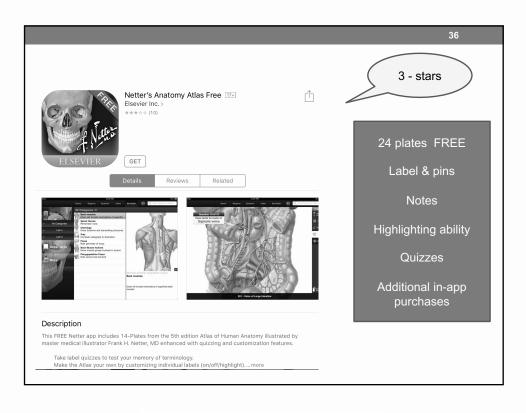




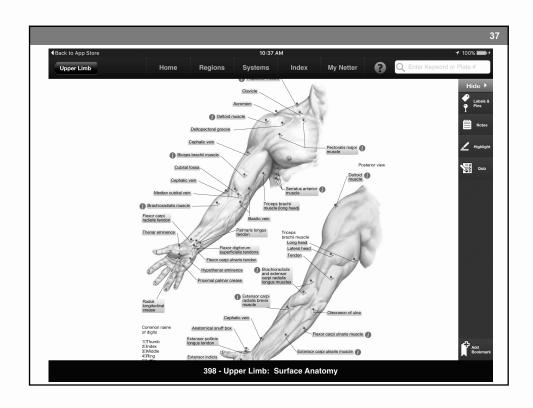








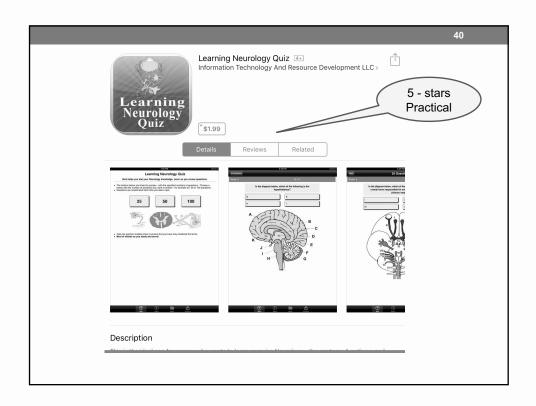




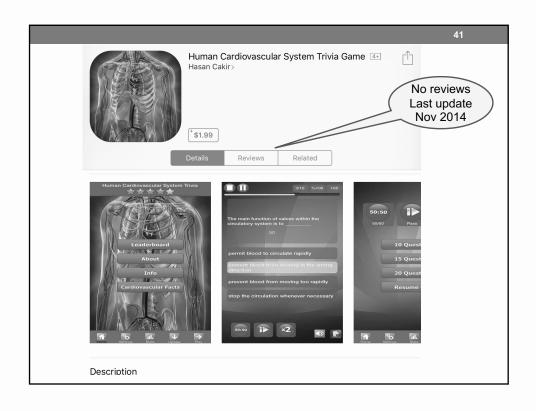


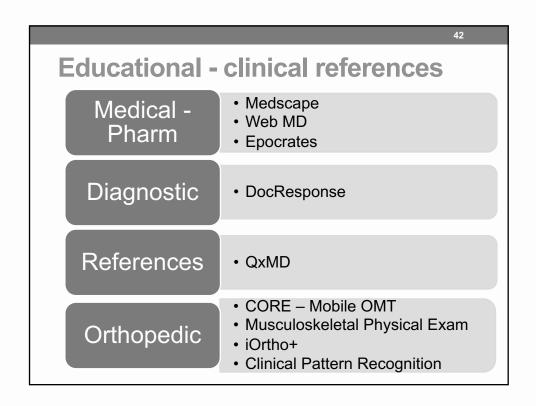




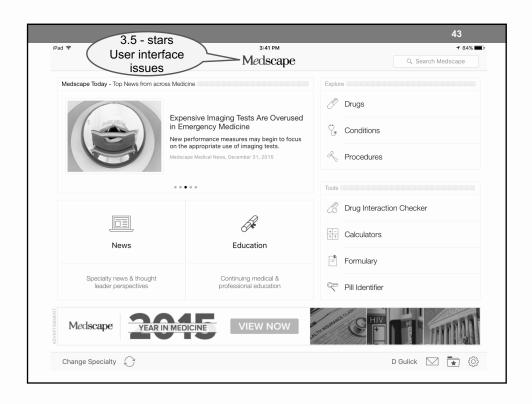






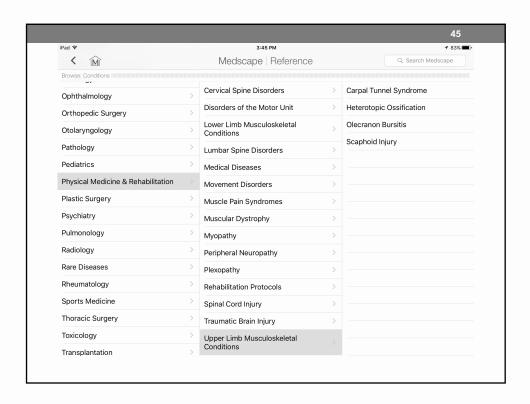


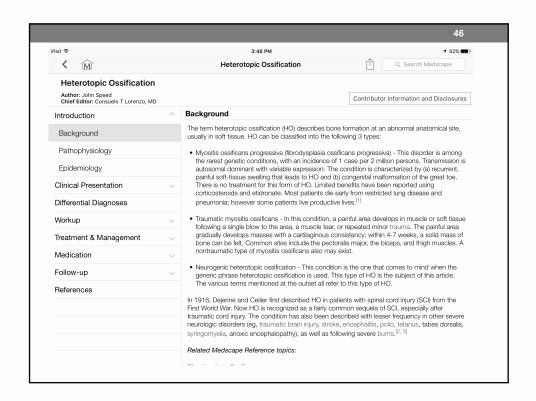




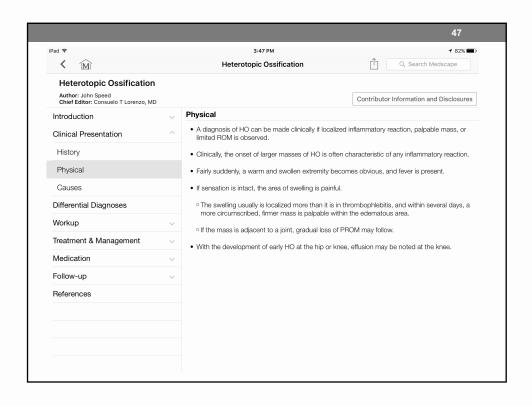


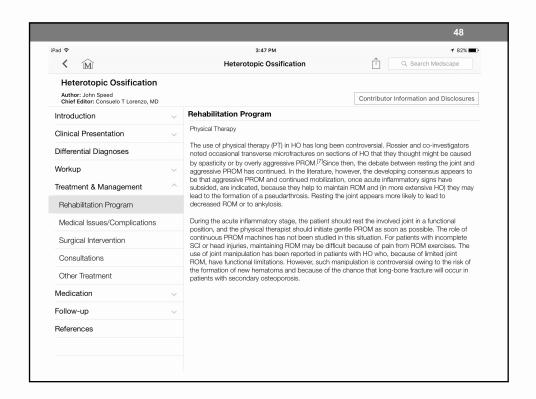




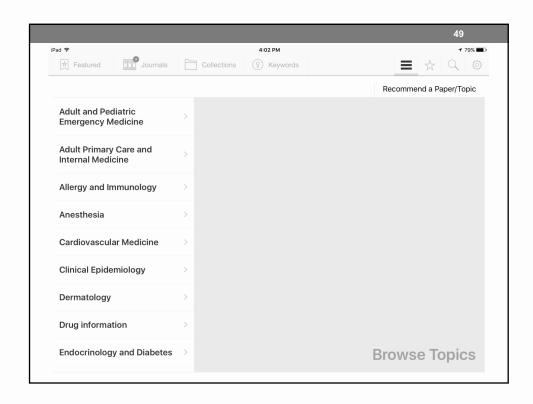


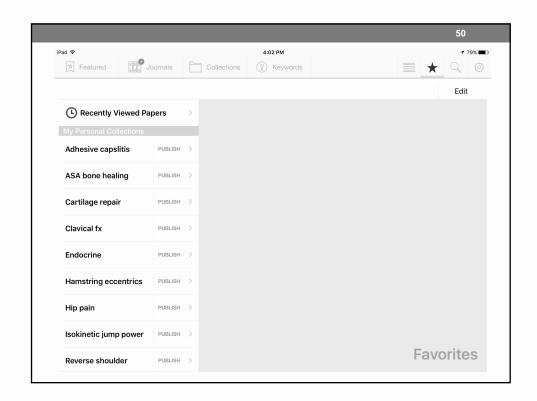






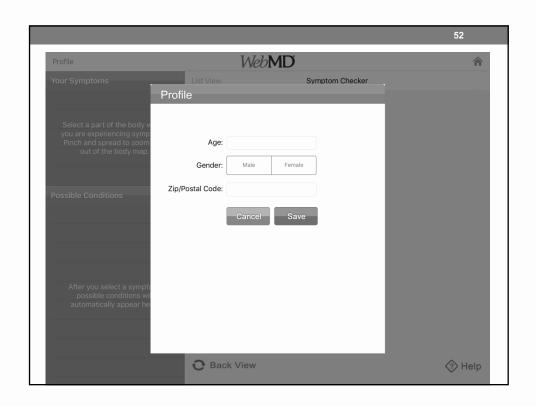




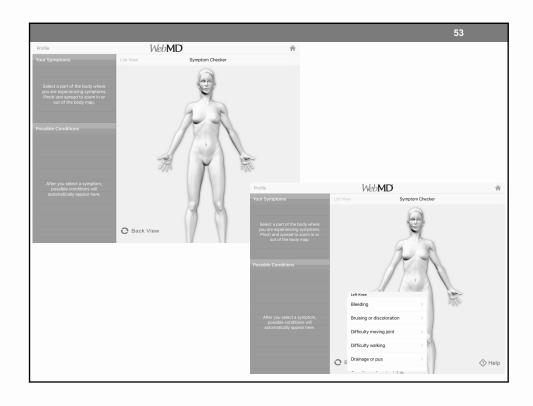


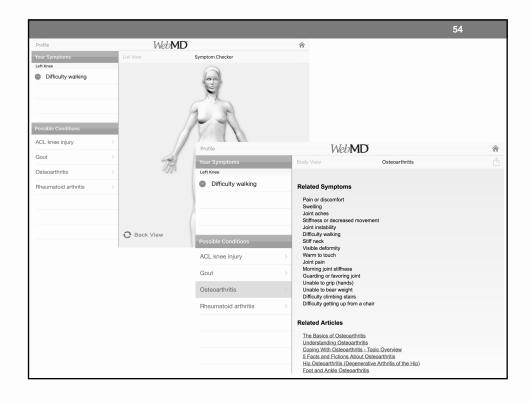




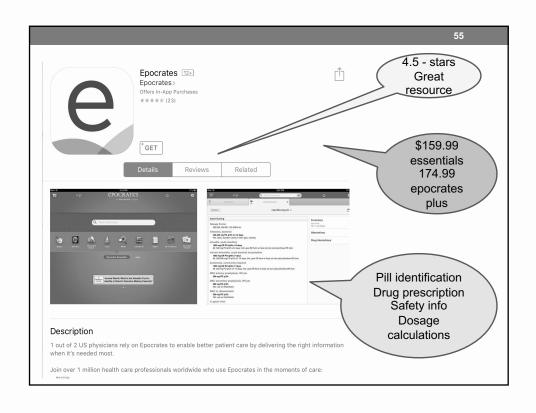


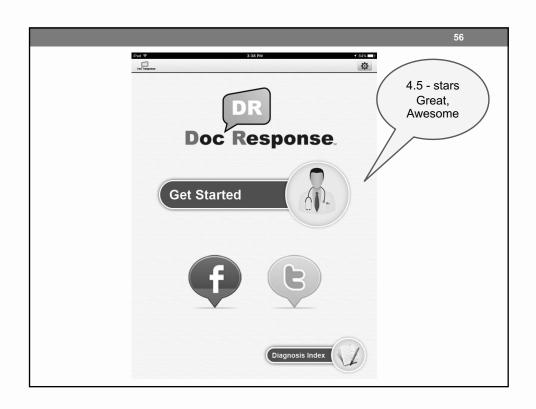




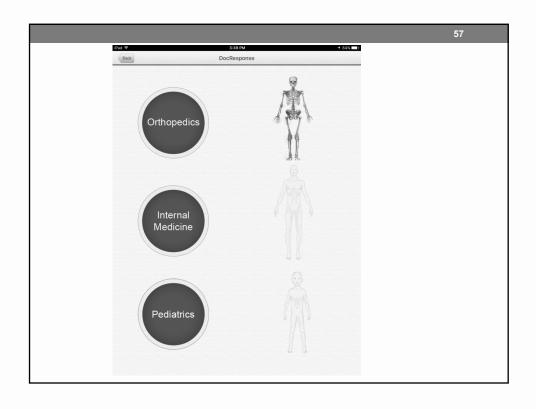


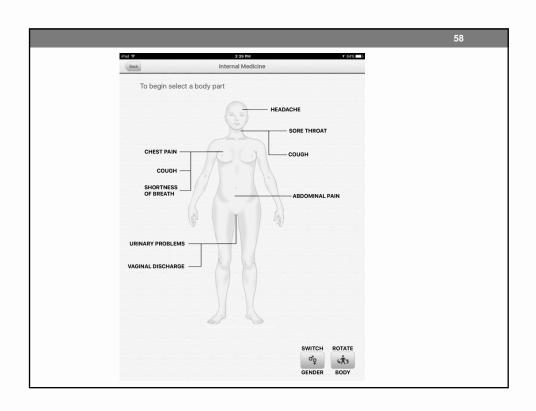




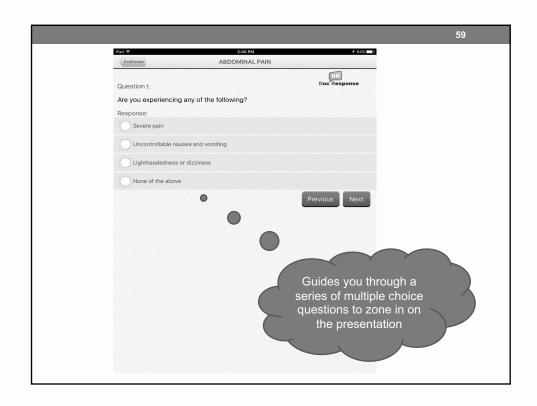


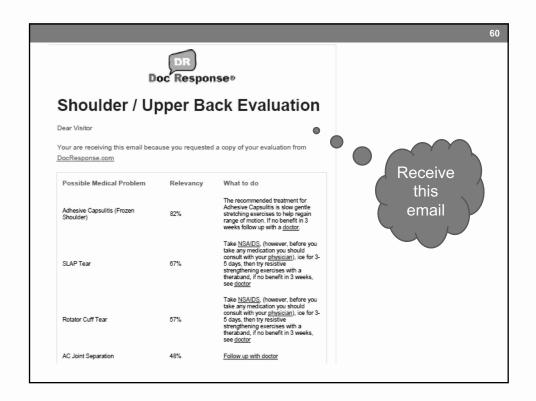




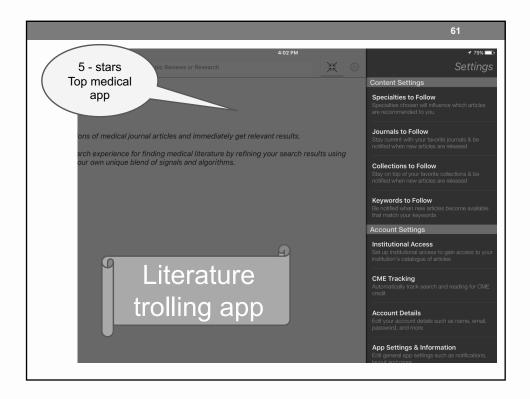


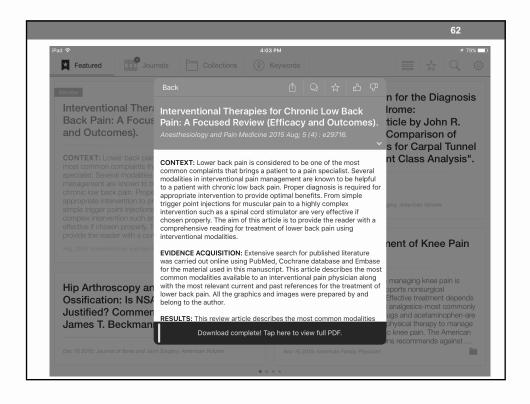






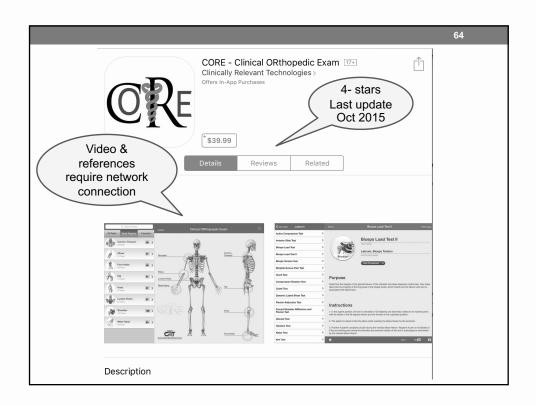




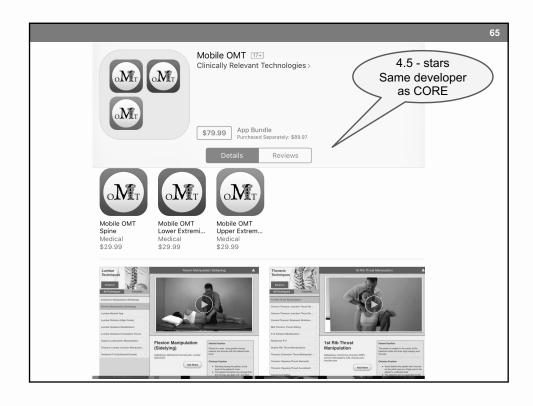


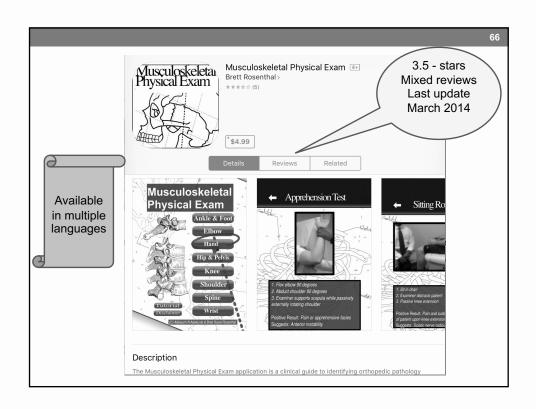




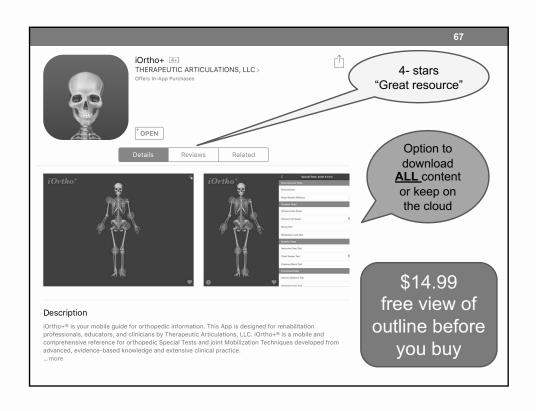


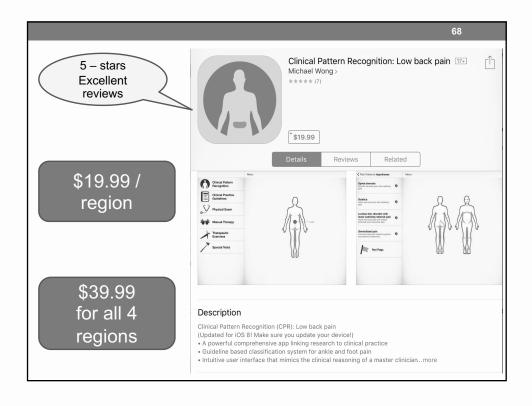




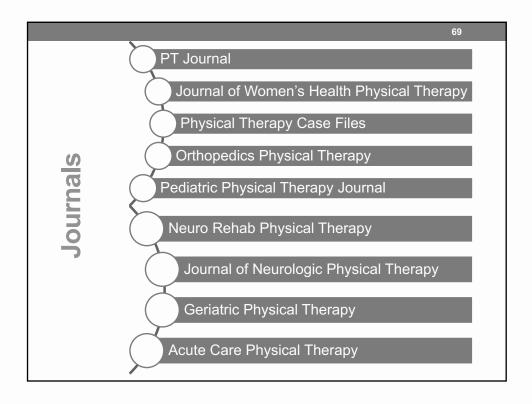








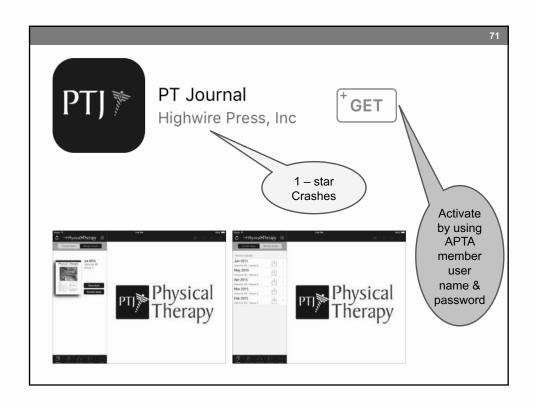




### **Journals**

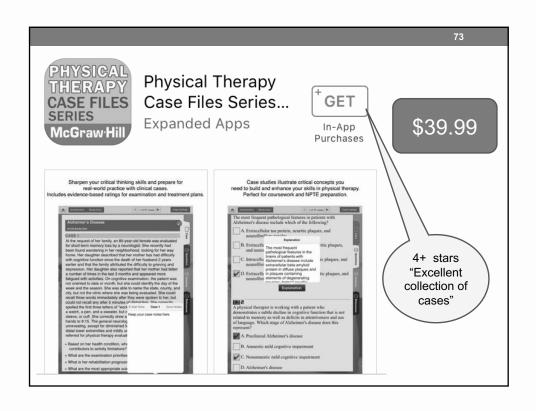
- Opportunity to access journal articles ahead of print
- Access to full journal archives
- In some cases, are free with professional association membership
- Purchase vs subscription model

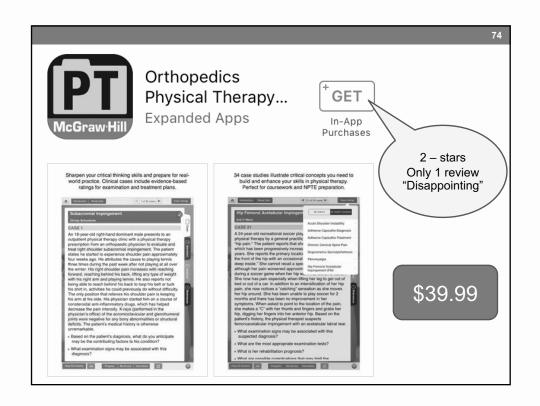




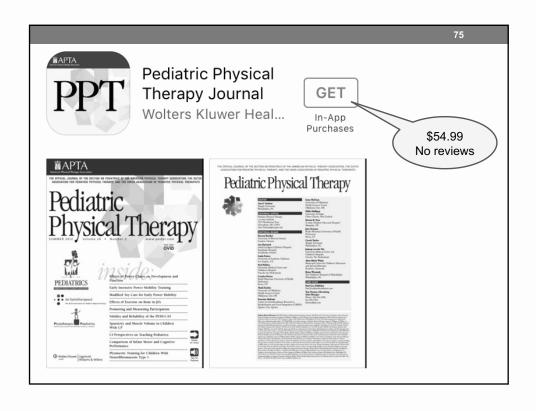


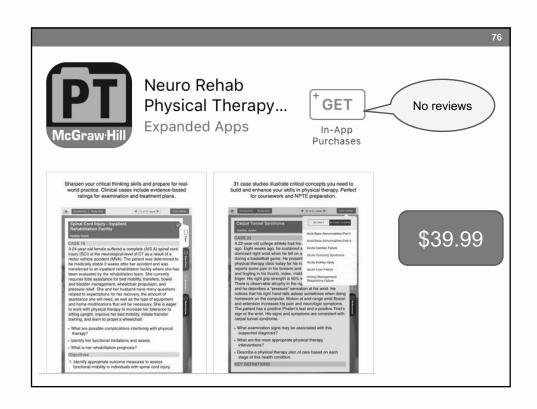




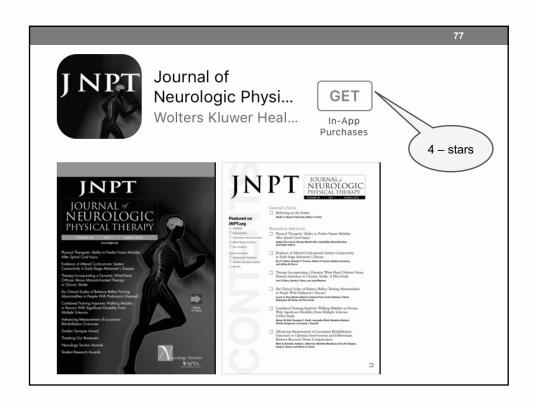


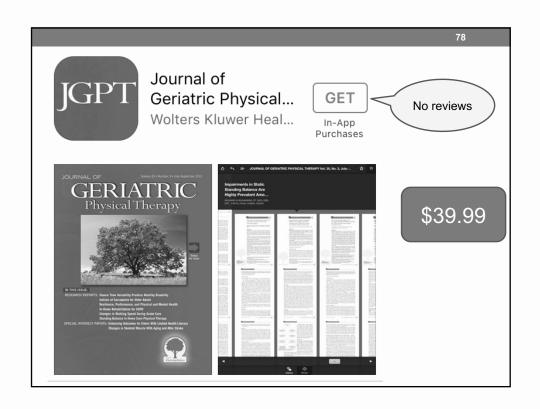




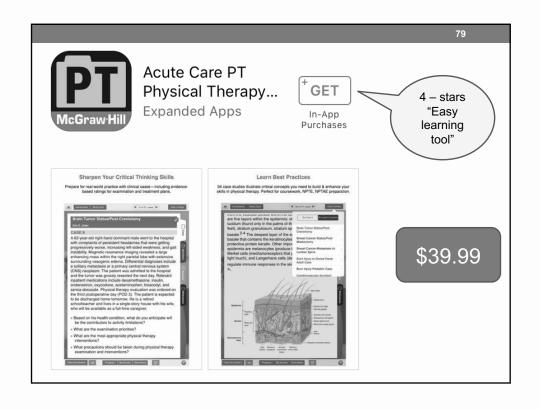


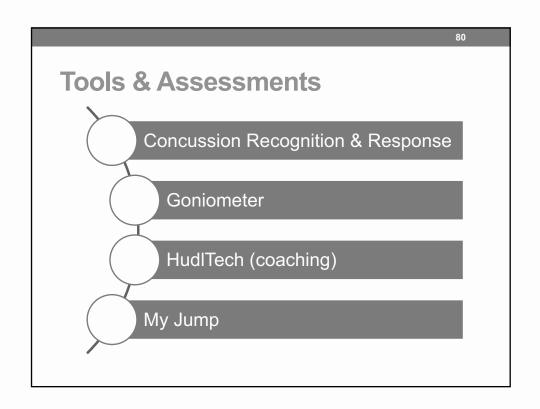












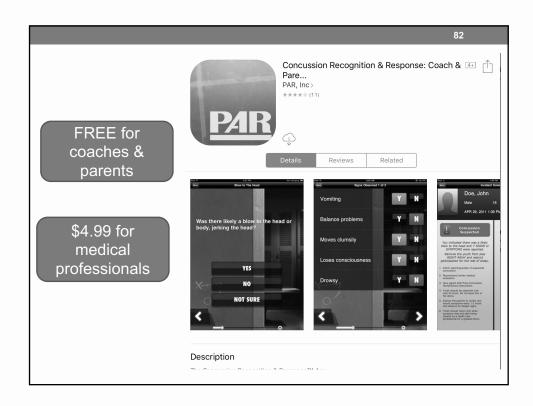


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## **Concussion Apps**

- Aim: To locate & review apps that assist in the recognition & assessment of a sports concussion & to assess their content with respect to that of internationally accepted best-practice instruments
- Methods: Search of international app stores & of the web using key terms such as 'concussion', 'sports concussion' & variants was conducted
  - The content of each app was benchmarked to the Sport Concussion Assessment Tool 2 (SCAT2) & Pocket SCAT2.
- Results: 18 of the 155 apps identified met the inclusion criteria.
  - 16/18 were available on an iOS platform; 5 required a payment to purchase
  - Apps were marketed for a wide range of intended users from medical professionals to the general public
  - The content of the apps varied from 0% 100% compliance with the selected standard, & 'symptom evaluation' components
- Conclusions: The surge in availability of apps in an unregulated market raises concerns as to the appropriateness of their content for different groups of end users

Hopin, Sullivan, Schneiders, Ahmed, Balasundaram, Williams, Meeuwisse, McCrory, 2015







Goniometry Apps using Smartphone Digital Inclinometer

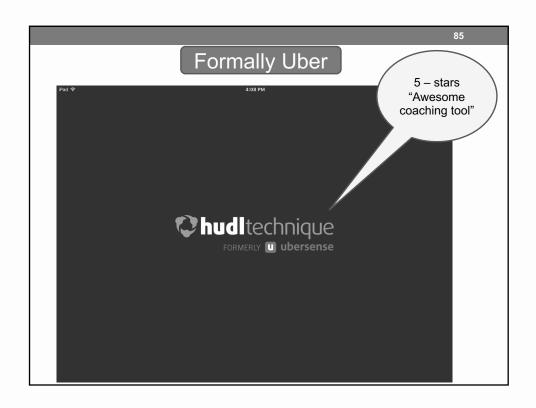
- Intraclass correlation coefficient (intrarater reliability) = 0.97
- Intraclass correlation coefficient (interrater reliability) = 0.76
- Tests of validity demonstrated excellent correlation with gold standards (r<sup>2</sup> > 0.99).

Vohralik, Bowen, Burns, Hiller, & Nightingale, 2015

- Interrater reliability for each of the smart-phones by operating system & phone type & for goniometer UG & inclinometer were excellent (ICC = 0.995 - 1.000)
- Concurrent validity when comparing the two smartphone apps to the goniometer & inclinometer was excellent (ICC = 0.998 - 0.999)
- Mean differences between devices was small (-0.4 to 1.2 degrees)

Wellmon, Gulick, Paterson, & Gulick, 2015

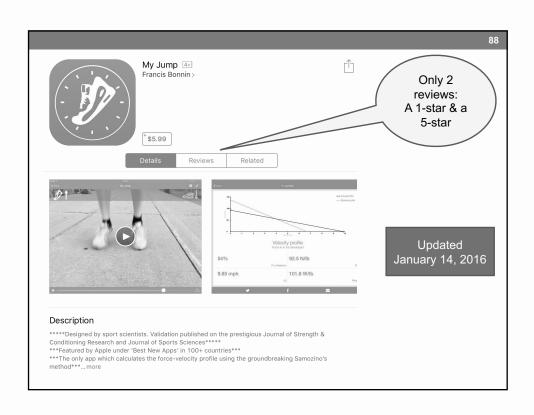




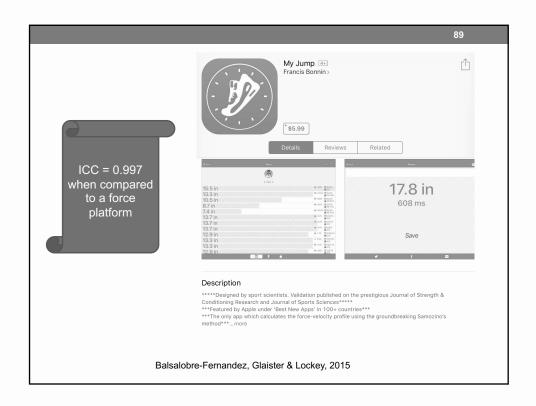


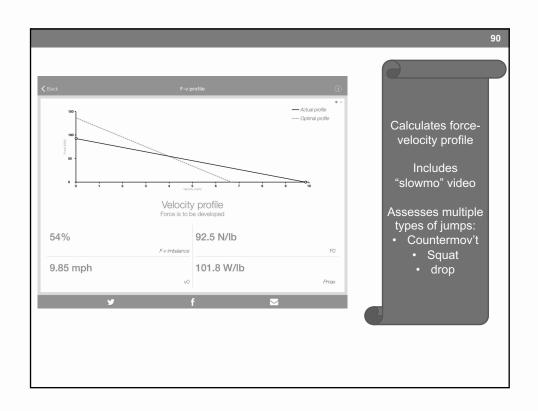




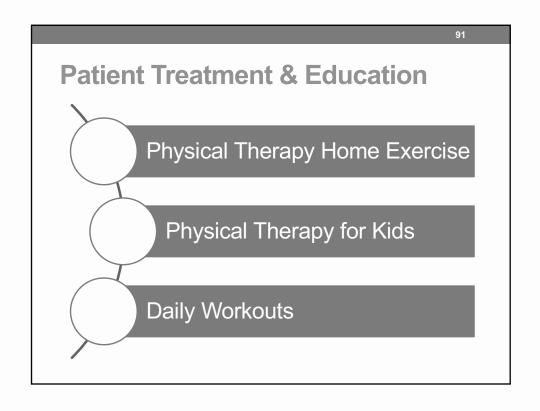


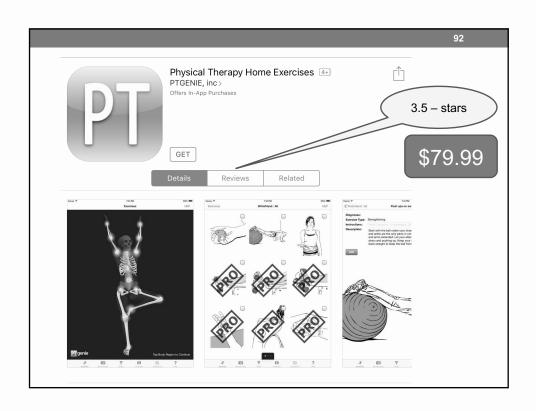




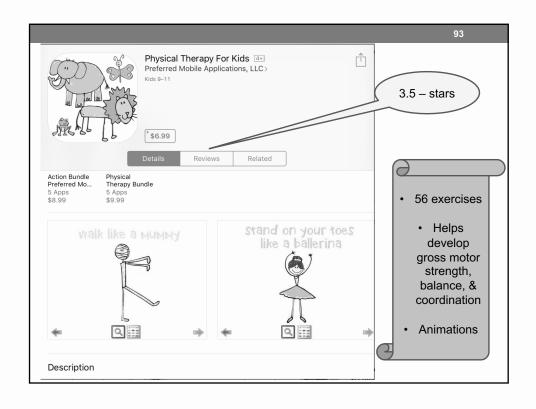






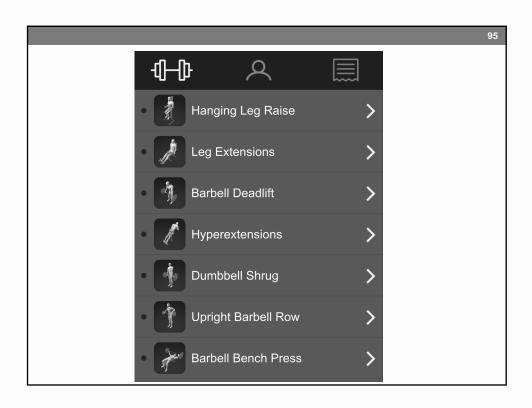


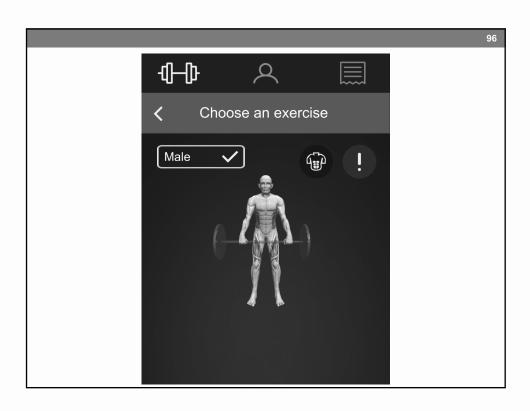




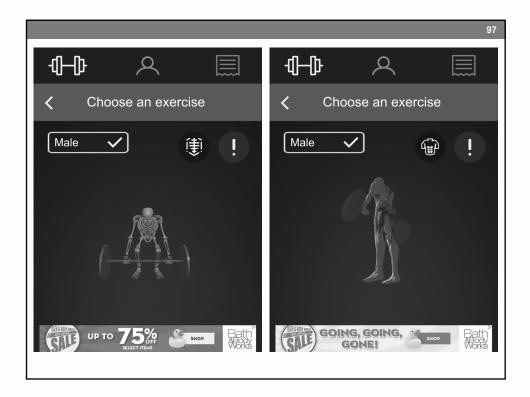












## **Summary**

- Determine your need
- Search the App Store or Google Play
- Read the description about the features, developer, & last update
- · Read the reviews with a filter
- Email the developer with questions
- Post your objective review to help others



**Final Thoughts** 

- Remember patient confidentiality
- Password your phone
- Think about hygiene

