

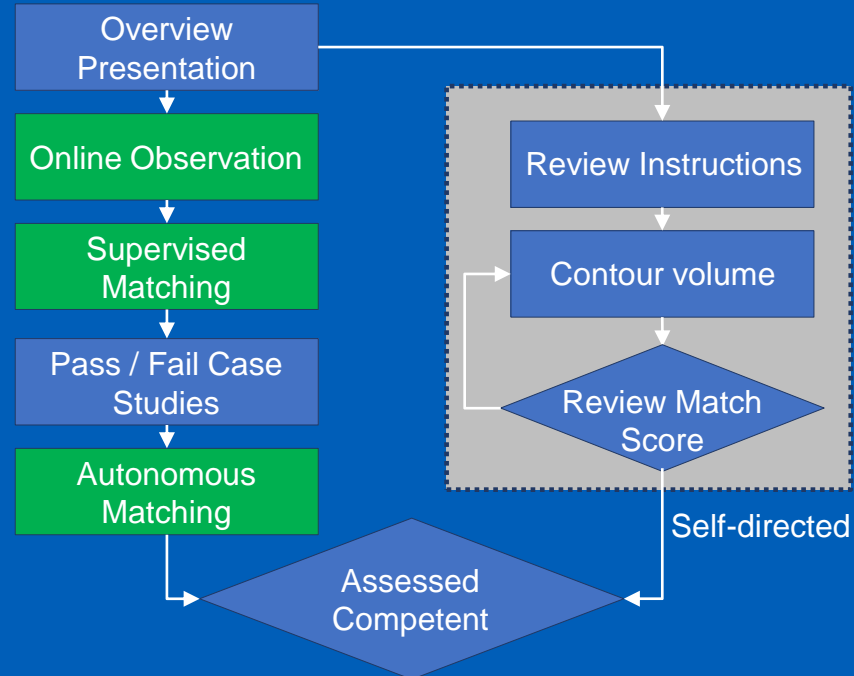
Radiographer training in advance of online-adaptive using web-based contouring tools.

Background

Online-adaptive radiotherapy (OART) may become the new gold-standard for radiotherapy to complex cancers. OART will require treatment radiographers to have advanced skills in organ at risk (OAR) contouring, critique of changes with target volumes and in plan evaluation - these skills are not conferred by current IGRT training. This study evaluates web-based contouring tasks (ProKnow) in IGRT training; gaining experience with OAR and target volume contouring. ProKnow uses peer-reviewed, expert contours on anonymous CT data-sets, providing Dice scores, which may help to reduce training burden on clinicians.

Methods

10 radiographers undertaking prostate IGRT training completed ProKnow contouring tasks. An anatomy and IGRT overview was delivered for trainees and supplemented by contouring instruction within ProKnow. Trainees contoured 6 CT data-sets (2x prostate, 2x seminal vesicles, 1x bladder and 1x rectum). Mean Dice scores for initial and final contours were compared using paired t-tests in Microsoft Excel.



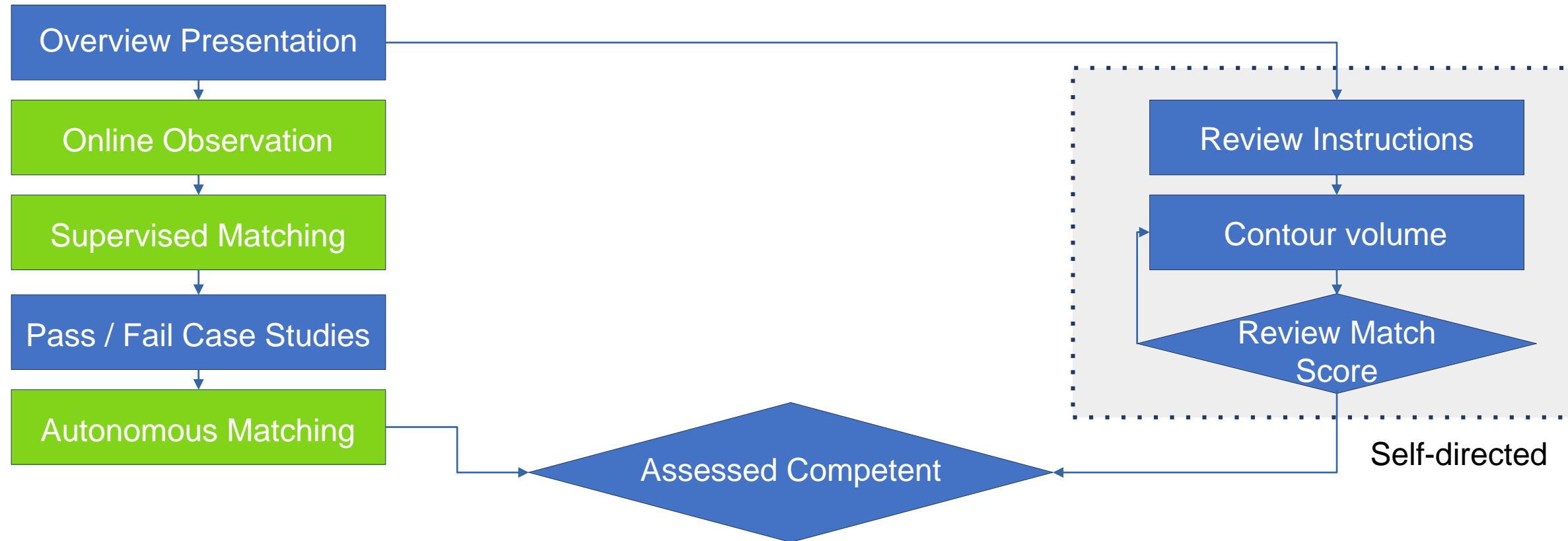
Results

Dice scores significantly increased for the prostate (0.739 vs 0.850, $p=0.001$), seminal vesicle (0.566 vs 0.794, $p=0.007$) and for rectum contours (0.720 vs 0.882 $p=0.010$) from initial to final attempts. All radiographers achieved satisfactory initial bladder OAR contours and therefore initial and final scores matched. The mean Dice score for the bladder was 0.943

Conclusion

This study shows radiographers significantly improve their contouring accuracy using this self-directed approach, limiting the time burden on training staff. OART capable hardware requires large investments; so OART must be used clinically early in the implementation to justify higher investment. This study indicates that integration of ProKnow tasks into radiographer IGRT training builds experience and skills within the radiographer workforce in preparation for rad-led OART services

Training Programme



Results

Contour	Dice (Initial)	Dice (Final)	StructSure (Initial)	StructSure (Final)	P value (Dice)
1. Prostate (Target)	0.690	0.848	28.75	84.30	0.001
2. Prostate (Target)	0.789	0.852	51.86	70.93	
3. Seminal Vesicles (Target)	0.698	0.821	47.21	87.19	0.007
4. Seminal Vesicles (Target)	0.435	0.766	19.01	85.43	
5. Bladder (OAR)	0.943	0.943	95.32	95.32	1.000
6. Rectum (OAR)	0.720	0.882	6.02	88.54	0.010

No RTTs re-attempted a bladder contour, therefore initial = final scores