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Author/s:

To, H;Cargill, A;Tobin, S;Nestel, D

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To Henry (Orcid ID: 0000-0002-3807-7324)
Tobin Stephen (Orcid ID: 0000-0002-6900-0899)

Title

Remediation in Surgical Trainees: Recommendations from a Narrative Review

Authors

Henry To PhD FRACS¹, Ashleigh Cargill LLB MD², Stephen Tobin MSurgEd FRACS FRCS (Edin) FRACSEd (ad hom)³ and Debra Nestel PhD FAcadMed FSSH^(4,5)

Affiliations

1. University of Melbourne, Parkville, Australia
2. St Vincent's Hospital, Fitzroy, Australia
3. Western Sydney University, Sydney, Australia
4. Department of Surgery (Austin), University of Melbourne, Heidelberg, Australia
5. Monash Institute for Health & Clinical Education, Monash University, Clayton, Australia

Corresponding Author

Name: Henry To

Address: Department of Surgery, Werribee Mercy Hospital, 300 Princes Hwy, Werribee 3030

Email: henry.to.surgeon@gmail.com

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Abstract

Introduction: Remediation involves formalised support for surgical trainees with significant underperformance to return to expected standards. There is a need to understand current evidence of remediation for surgical trainees to inform practice and justify investment of resources.

Methods: Following the principles of a systematic review, we conducted a narrative analysis to make recommendations for remediation of underperforming surgical trainees.

Results: From a review of 55 articles on remediation of trainees in medical and surgical sub-specialities, we have identified system and process level recommendations. Remediation is reported as long-term, complex and resource-intensive. Establishing a defined and standardised remediation framework enables co-ordination of multi-modal interventions. System level recommendations aim to consolidate protocols via developing better assessment, intervention and re-evaluation modalities whilst also strengthening support to supervisors conducting the remediation. Process level recommendations should be tailored for the specific needs of each trainee, aiming to be proactive with interventions within a programmatic framework. Regular reassessment is required, and long term follow up shows that remediation efforts are often successful.

Conclusion: While remediation within a programmatic framework is a complex, it is often a successful approach to return surgical trainees to their expected standard. Future directions involve applying learning theories, encouraging research methods and to develop integrated collaborate protocols and support to synergise efforts.

1 Introduction

With guidance of surgical educators, it is expected that surgical trainees incrementally develop skills during their training across established core competencies (1). Occasionally, some trainees show considerable and/or repeated underperformance which requires remediation, defined “as one or more interventions in response to assessment against a threshold standard of performance” (2). Remediation is complex as the underperformance itself is usually multifactorial, related to the trainee’s workplace, social and personal responsibilities that influence their learning capacity (3). Remediation should be governed by policies that ensure equitable opportunity for action and due process which results in a fair and resolute outcome for all parties.

Assessment approaches can provide pointers to target remediation. Workplace assessments at regular intervals (3 to 6 months) evaluate professionalism, technical skills, medical knowledge, teaching, leadership, health advocacy and cultural competency (4) which rely on the judgment of clinical supervisors for honest appraisal. Directly interviewing trainees and colleagues can identify external influences affecting performance (personal pressures, poor educational supports, pressured work environment) (3). At times, review of a sentinel event that triggered the crisis reveals long-standing underlying issues, where a historical review of assessments can uncover repeated patterns of underperformance that were not amenable to, or yet to be addressed by, standard training measures.

Managing underperformance is a significant proportion of regular practice for surgical educators and the means to do so is complex. Underperformance is common, as studies show that 5-17% of trainees per year require programmatic remedial training, irrespective of level of training (3, 5, 6). Developing integrated remediation programs has been challenging, as trainees can be under the supervision of multiple educators with different styles and views. In addition, there are different regulatory jurisdictions that trainees may be accountable to, e.g. local hospitals, training programs and medical registration bodies (2, 7). Remediation should be specifically targeted to the needs of surgical trainees who require added emphasis on technical skills and performance (8).

There is a need to understand current evidence on remediation recommendations for surgical trainees to inform practice and to justify the investment of resources (9). We previously performed a scoping review that on remediation for surgical trainees, and this can be further informed by experience from other sub-specialities (10). Remediation is a complicated topic with multiple perspectives and approaches which are not currently co-ordinated or synchronised. Management crosses multiple jurisdictional boundaries including hospital networks, training boards and education institutions. In this review, we aim to summarise recommendations for remediation based on the published perspectives and principles in remediation of trainees to inform supervisors, employers, educators, trainees and policy makers, particularly to reform the program’s structure, approach and resource development for surgical training.

2 Methods

In this narrative review, we systematically identified relevant published articles to provide a comprehensive synthesis of current literature (11, 12). We followed the following principles of a systematic review by: searching and identifying the published research, synthesising articles in textual form, and analysing their contribution and value (13). Drawing on the literature and our research team’s collective experience we sought to answer the question: “What are optimal approaches to remediation of underperformance in surgical trainees?”

Two researchers (HT and AC) searched medical and education journal databases (MEDLINE, Web of Science, EMBASE, Scopus, PsychInfo, ERIC and CINAHL) for peer-reviewed, English language articles published after 1995 with the search terms describing remediation processes and practice specifically for trainees: *remediation*; *remedial training*; *trainee*; *internship*; *residency*; and *resident*. References from each article were reviewed. We further screened articles based on the inclusion criteria for those that,

- 1) Investigated remediation;
- 2) Researched medical education;
- 3) Focused on post-graduate trainees, particularly surgical trainees;
- 4) Related to remediation of underperformance.

Recommendations were drafted by HT, and consolidated with further input from all co-investigators and key articles (7). Next, through a series of discussions via email and video conferencing, recommendations were refined until reaching consensus. When the evidence was lacking or without clear consensus, we developed a list of areas for future research. All authors contributed with comments, evidence and edits.

3 Results and Discussion

55 articles were identified by our screening process (Figure 1), 24 specific to surgical trainees. Recommendations from these articles were collated (Tables 1, 2 and 3).

3.1 System Level Recommendations

The established learning program provides the learning context for the trainees, and issues at this level results in a discourse between the learner and the learning context. Though remediation interventions typically focus on individual trainees, principles from this broader level can be developed to benefit all trainees at different phases of their learning (Table 1).

3.1.1 Remediation Should Form Part of the Training Process

We recommend that surgical training programs should be restructured to embed a concurrent formal remediation program (14). Remediation programs have been proven successful in single domains (such as medical knowledge) that has also improved performance for trainees in other domains (15-21). Surgical trainees who underwent remediation were able to achieve standard and completed training with some or little impact to total training time (21).

Promotion and availability of a remediation program, separate from standard training, normalises it as a component of competency-based learning, which is one that emphasises development of learning skills rather than the endgame attainment of capability. Remediation programs should ideally be confidential, safe from scrutiny, easily accessed, and should be promoted as a zone of learning focussing on self-improvement, personal development, resilience building and intensive feedback (22, 23). This would involve a sub-group of surgical educators/trainers dedicated to a parallel program of “training enhancement”, specifically to provide support these trainees under remediation, and can also identify improvements to aspects of the training program and to provide support to supervisors.

3.1.2 Align Selection and Assessment for Early Intervention

Remediation and attrition rates are seen as key indicators of an efficient selection process (24). It has been argued that remediation can be minimised if there was appropriate screening of trainees at the

time of selection using the correct tools (25). Selection is the first, and perhaps most important assessment in surgical education (7) as it determines whether the candidate has the qualities that allow development into a safe and competent surgeon.

Following on from the selection process, teaching and curricula should align with an expected graded improvement in knowledge, skills, attitudes and behaviours (26). Assessment to determine this development should be matched to incorporate the same high degree of fairness, reliability, transparency and validity as the initial selection processes. Using the same tools can enable targeted assessment at specified intervals and stages of training (or “milestones”(27)) to identify issues for early intervention. For example, specialised assessments, such as situational judgement tests, have been used at selection and as predictors of remediation in domains that are often deficit in surgical trainees (28).

3.1.3 Supervisor Development and Support

The surgical supervisor was often reported as the only person involved in remediation of trainees and described stress and increased workload (5, 16, 18-21, 29-34). If there is minimal progress, they can lose confidence in their ability to conduct remediation, especially in certain domains such as professionalism where experience is often lacking.

Remediation requires more time, resources and expertise than currently allocated or expected (16, 29, 31, 32, 35, 36), and supervisors need recognition and remuneration for the number of hours required to address issues. To build individual and institutional capacity, studies encourage partnering with experienced educators for this specialist work (1, 9, 37, 38). Studies encourage a team approach to remediation (17, 35), that enables contributions from those with complementary expertise such as educational experts (3, 39) or peer support (40). Specific remediation educational skills for surgical supervisors include specialised teaching strategies, theories of learning and cultivation of emotional intelligence, empathy and flexibility. In addition, system level support should encourage a community of practice of select, highly motivated surgical educators who can consult and support supervisors (41). Advanced trainees and fellows may also be encouraged to develop skills in surgical education through structured courses and communities (42) (advancing the scholarship/teacher competency) to resource this group for the future (43).

3.1.4 An Attitude of Progressive Improvement of Learners

The emphasis of training programs should be of progressive improvement, and for equipping trainees with the means to continue development of skills rather than only meeting minimal threshold for competence (23). The aim is to have methods that anticipate and prevent underperformance by developing self-management learning abilities and understand the progressive nature of learning. Surgical trainees may typically be stronger in some competencies (such as technical skills) over others, and an emphasis on developing learning skills enhances insight and development of other areas. Mastery learning theory involves attitudinal development and proactivity toward seeking feedback and reflective practice. For professionalism, use of meta-cognition and professional identity development as seen in medical remediation studies (9), permits personal insight, critique and motivation for improvement in all other competencies (44). This approach can also ensure a sustained success of training beyond remediation by equipping with tools that emphasises ongoing learning development.

3.1.5 Due Process for Legal Responsibilities

The identified studies show that the process of remediation must be transparent, fair and confidential so that all parties understand and agree to the process and outcomes (31). Trainees have the right to

access the same evidence and resources as their assessors to confirm fair assessment and then assist in the development of an agreed management plan. Institutional policies should support and encourage thorough documentation and communication that outlines the decision for remediation, including a written and clear sequence of events, and subsequent expectations for all parties involved (45). Due process also ensures that the remediation fulfils legal responsibilities, and the process can then comply with its pact to the wider community to produce safe and competent surgeons (19).

3.2 Remediation Process and Approaches

Remediation is most successful when based on analyses to detect patterns of maladaptive development/alignment (7) enabling targeted strategies. Its approach should be adapted to individual needs and be outcome-driven with achievable targets (Table 2).

3.2.1 Avoid Stigmatising the Trainee

Underperformance has implications of sub-standard behaviour in typically high achieving individuals. Underperforming trainees can experience a range of emotions in response to their failings and/or the threat of dismissal. Trainees can feel further marginalised if they constantly spend time away from clinical duties or have constant re-assessments. An educational alliance and growth mindset can prevent stigmatising underperforming trainees and sets a productive tone for remediation (7). Even the terms used in remediation should be modified to less emotive language such as “learning support” and “performance management” (14).

Supervisors should aim to establish trusting relationships with trainees that can provide empathic emotional guidance (7). Encouraging a self-regulated learning perspective allows the respectful addressing of the trainee’s self-efficacy or pessimism about remediation (46). Collaborative development of the remediation plan between trainee and supervisor supports learner autonomy, and time must be given for the trainee to adjust their motivations and strengthen their self-regulation skills to make progress.

3.2.2 Intervene Proactively

It is important to be proactive in seeking underperformance and actively instituting remedial activities to prevent lapses. Targeted assessments hope to provide early identification of underperformance (14), and studies show that early intervention maximises the success of remediation interventions (17, 21, 30, 31, 35, 47). Often, early intervention cannot take place as trainees do not self-report, reflecting limited personal insight (48). This involves assisting trainees to develop the ability to understand the recognise their own deficiencies, and is key in the identification of underperformance and compliance with remediation. Learners typically inaccurately self-assess, tending to over-rate themselves, and it has been seen that in the medical knowledge domain, academically weaker students tend to avoid seeking assistance (49). Encouraging and improving personal insight is linked with motivation for change and compliance (50). This can be also be improved by identifying mental health issues (15) and undiagnosed learning and behavioural deficiencies (51).

3.2.3 Collect Relevant Data Including Exploring Multiple Causes of Underperformance

Additional performance data should be sought as soon as there is one objective underperformance measure is identified (e.g. failed examination or supervisor concern), as there may be deficiencies in other competencies. Studies in other specialities show that multi-source feedback facilitates accurate identification in a range of clinical scenarios, which should be performed by multiple observers in more than one context (52) (as clinical competence is impacted by case specificity and should not be

assessed on a single instance). Supervisors should have access to trainee summative assessments in multiple domains in order to identify patterns over time (6).

External factors can affect performance, such as physical conditions (new-onset medical conditions), mental health issues or previously undiagnosed learning disabilities (7). Some trainees may struggle with a multitude of issues including a chaotic or poorly organised healthcare delivery system, poorly perceived or understood learning environments, cognitive dissonance from ethical dilemmas or poor role modelling (8). Trainees from minority groups are at risk of stress from the consequences of discrimination. Recognising these factors allows these issues to be addressed separately to formal processes for remediation, such as providing counsellors or support staff.

3.2.4 Use Targeted, Individualised Processes within a Framework

Most underperforming trainees demonstrate deficiencies across multiple domains (53). Experience from other specialities show that successful interventions for trainees need a holistic, tailored approach, and hence needs to be multi-modal to address complex concerns (54-56). There are multiple studies with effective surgical remediation programs for academic medical knowledge, and centres developing programs for non-technical domains (10). These studies show that a co-ordinated combination of component-based approaches is recommended, using tools such as workplace-based appraisals (with observation and feedback), mentoring, self-learning and reflection. Ideally, this should be incorporated alongside current training models.

A programmatic framework co-ordinates the specific interventions (Figure 2) (57). The program should include regular, scheduled meetings to assess progress and achievement of goals, with high-quality feedback and assessment for midcourse corrections if there is lack of improvement (1). As part of the framework, supervisors should clearly specify a timeframe for expected improvement. Data generally supports long term interventions of 6 to 12 months that permit a deep attitude/skill change over the period (15, 18, 20, 33, 39, 40, 58).

3.2.5 Provide an Adequate Support Structure

Individual trainee support assists the trainee through this turbulent time. As discussed, there may be external factors such as mental health issues or external pressures as the cause of underperformance (15), or some trainees have undiagnosed learning and behavioural deficiencies that manifest in particular work environments (51). Formal mental health assessment can be a component of initial assessment that can then provide ongoing mental health support during remediation (37).

There is also an effect on the entire surgical team and surgical service (31). Other surgical team members may have already compensated for underperformance in one team member, and now are required to further adapt as the same trainee has remediation obligations. Workforce issues and communication of change need to be carefully balanced, such as providing additional staff, adjusting hours, or recognising and reimbursing additional work by other team members.

3.2.6 Create Compassionate Means for Alternative Pathways

Most would agree that not every doctor who begins the surgical training pathway should graduate from the program. The remediation program should also enable a realistic assessment of the likelihood of long-term success for the trainee and encourage honest self-reflection (7). Remediation should also offer viable options for exiting the program, particularly considering personal or financial implications to changing specialities. Counselling, networking and recognition of prior learning/experience with other specialities would provide better informed decisions about the transition to other specialties and allow trainees to view it as a viable option.

3.2.7 Long Term Follow Up

Underperformance is often a pattern over time rather than an isolated, resolvable problem. Observations over time will ultimately determine if a trainee appropriately progresses to meet the demands of the expected performance, or alternatively never gains independent ability (59). Due to the stress of the remediation program, there will be fluctuations in performance. After the remediation period, a supportive educational culture encourages self-monitoring and to seek help if there are future performance lapses. Long term engagement also ensures that trainees demonstrate the internalised new attitudes and skills and seeks to be pro-active toward re-engagement.

3.3 Future Directions in Remediation

There are some areas which require further development and research, which will aid the development of effective remediation processes in the future (Table 3). These concepts have already been incorporated in revisions in some surgical training programs (60).

3.3.1 Apply Learning Theories

Learning theories permit the interpretation of the outcomes of interventions and allows these to be applied in different situations (61). They also summarise and bring to light the values, attitudes and cultural teaching that are observed from individual studies. One example is the application of behaviour change theory to enhance performance (38). Behaviour change requires the exploration of attitudes, such using an integrated behaviour intervention as proposed by Prescott et al. in the remediation of underperforming clinicians in the UK (38). This applies a trans-theoretical model (precontemplation, contemplation, preparation and action) via a series of exploratory discussions to help the trainee recognise their deficiencies and address barriers. This addresses non-cognitive barriers to remediation and can be performed concurrently with other remediation interventions.

3.3.2 Promote Evaluation of Remediation Approaches

There is a need for further research to drive novel approaches in surgical remediation. A research mindset encourages processes that collate data and develop resources. A research focus can also formalise the evaluation of remediation processes so that standardised reporting and comparisons can be made. These can then provide further evidence base to the most effective strategies and allow other institutes to adapt the same strategies in their health context.

3.3.3 Establish Integrative and Collaborate Methods and Support

Many of the processes and interventions outlined draw from different viewpoints in medical education. Resources devoted to remediation and the lessons learnt from this process should be available to all educators and learners. Remediation for surgical trainees has been mainly reported by major academic centres in North America (10) and this should be broadened. Collaborative, international networks of surgical academic bodies enables the synergy of efforts to provide support and suggestions to supervisors in need. Similarly, advice from other medical speciality professional bodies can provide further insights into effective approaches and interventions (7).

The strengths of this study include the broad approach taken with a diverse and experienced research team. Limitation of this study includes a focus on articles from mainstream literature. Our inclusion criteria limited studies to surgical trainees, with broader concepts applicable from studies of medical students and surgeons. As per narrative review guidelines, we did not rate the quality of the studies identified and drawn our own recommendations from the studies identified based on prior educational experience.

4 Conclusion

Underperformance is complex, and remediation processes should be equally sophisticated to provide a long term, targeted and individualised process that ultimately has a successful outcome. Remediation can be resource-intensive, but a defined, standardised and explicit framework enables co-ordinated application of multi-modal interventions with robust outcome assessments. Practice and policies can be developed to ensure that a systematic and transparent approach to implementation is achieved. Application of learning theories, research and consultation with other medical specialities can inform the development of novel remediation efforts for the surgical context. Ultimately, remediation aims to improve the underperforming trainee to a safe and competent practitioner for beneficial patient outcomes.

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Author's Contributions

HT was involved in the conceptualisation, data curation, formal analysis, investigation, validation, visualisation and wrote the original draft.

AC was involved in data curation, formal analysis, validation and writing – review and editing.

ST was involved in conceptualization, project administration, supervision, writing – review and editing.

DN was involved in conceptualization, project administration, supervision, writing – review and editing.

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Figure Legends

Figure 1 – PRISMA flow chart of screening of articles on the remediation of underperformance of sub-speciality and surgical trainees (62).

Figure 2 – An example of a framework for remediation of underperformance in medical education (57).

List of Support Information

Nil

Tables

Table 1 – Summary of system level issues and specific strategies for effective remediation

<i>Trainees often need remediation</i>	Develop a sub-group of surgical educators/trainers within the community of surgeons to resource these suggestions
Strategy 1: incorporate remediation as part of the training process, perhaps as an additional zone of “training enhancement” to be accessed if required	
<i>Selection has not identified trainees who need remediation, or who drop out</i>	
Strategy 2: Match the selection assessment process with the training assessment process by evaluating competencies by similar tools and methods	
<i>Supervisors feel inadequately supported to perform remediation</i>	
Strategy 3: Provide recognition for remediation efforts, and enhance supervisor development and support	
<i>Trainees can meet minimum assessment requirements and have unrecognised major deficiencies</i>	
Strategy 4: Develop systems that aim to progressively improve learners, e.g. self-management, insight and proactivity	
<i>Legal aspects of remediation are inadequately addressed</i>	
Strategy 5: Recognise due processes for transparency, fairness and confidentiality	

Table 2 – Summary of remediation process and approaches

Avoid stigmatising the trainee
Intervene proactively, do not rely in their initiative
Collect relevant data including exploring multiple causes of underperformance
Use targeted, individualised processes within a framework, that includes regular reassessment and tangible outcomes
Provide a support structure around the trainee
Develop compassionate mean for alternative pathways
Follow up the trainee long term

Table 3 - *Future Directions in Remediation*

Apply learning theories
Encourage research methods
Establish integrative and collaborative methods and support

Figures

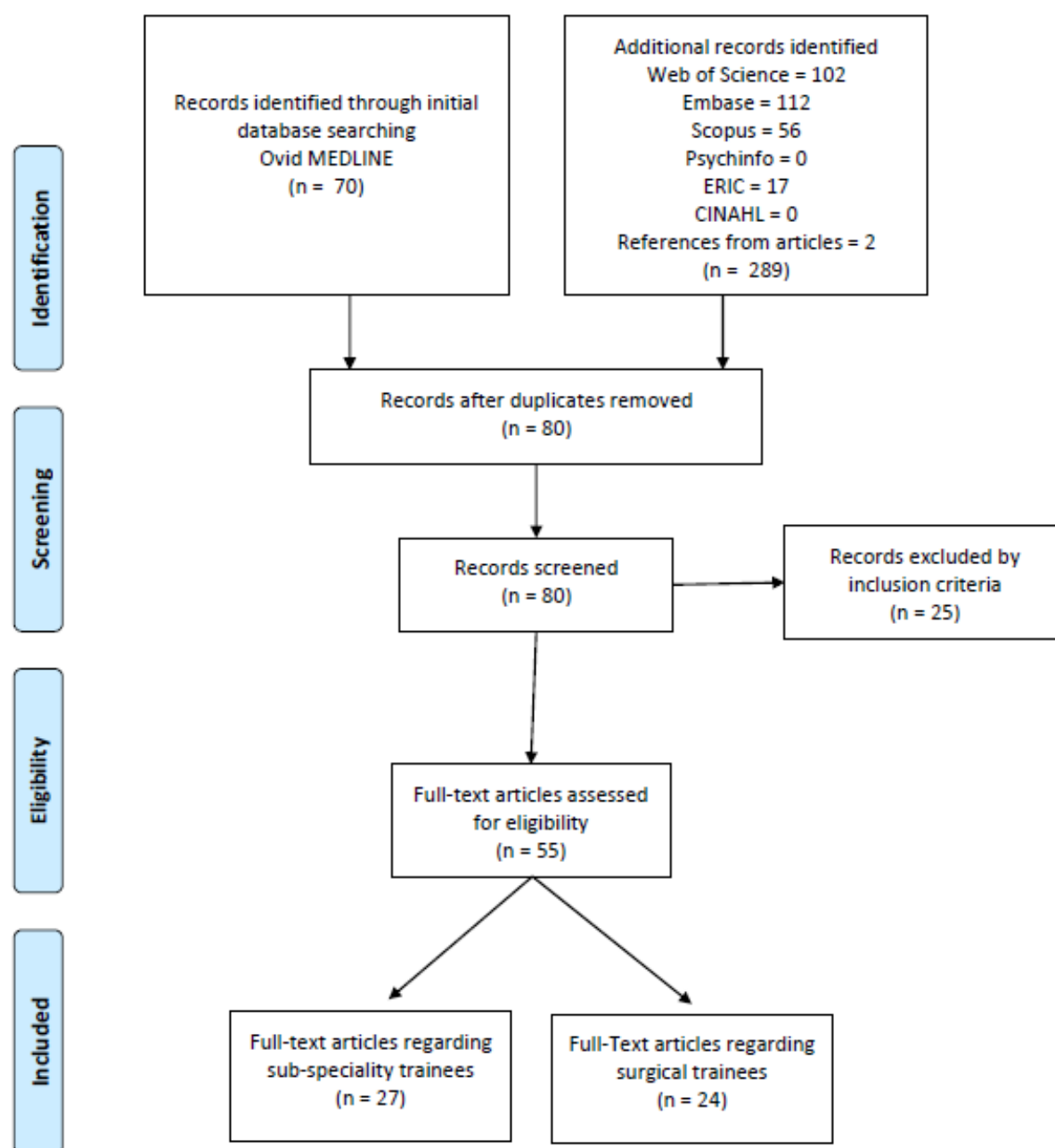


Figure 1 – PRISMA flow chart of screening of articles on the remediation of underperformance of sub-speciality and surgical trainees (62).

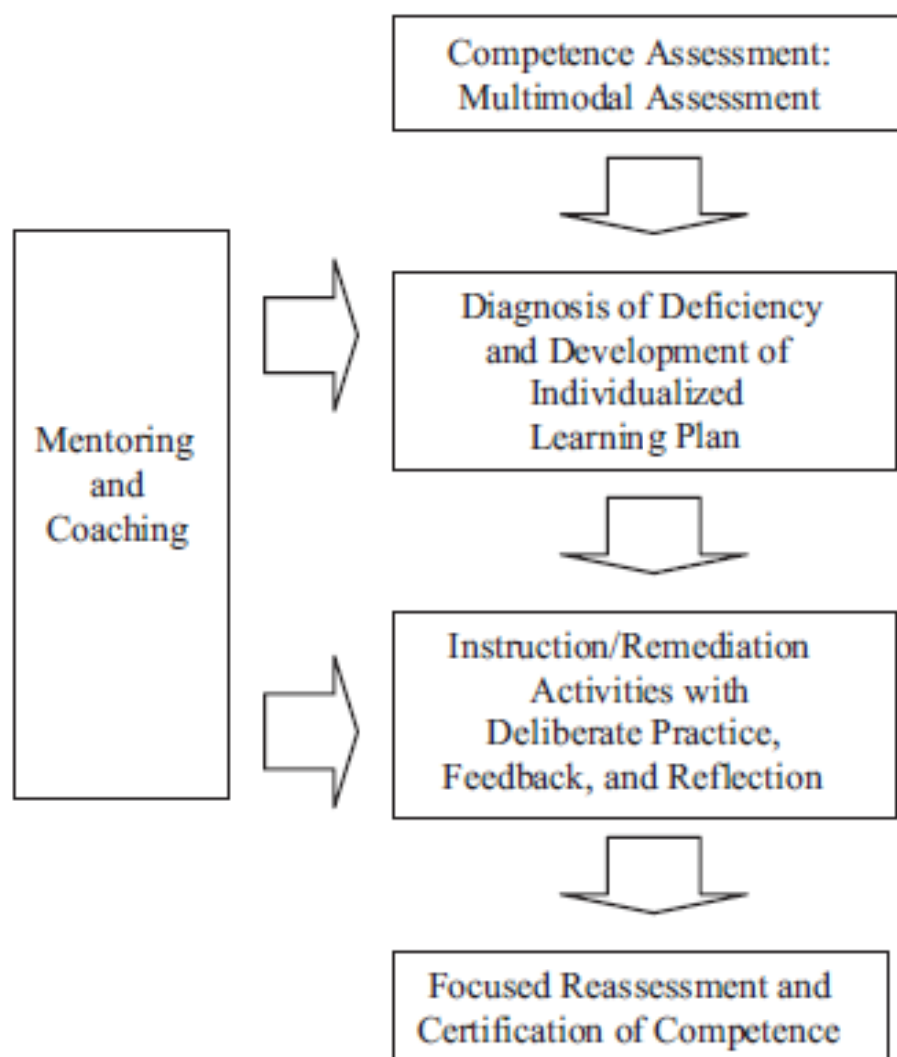


Figure 2 – An example of a framework for remediation of underperformance in medical education (57).

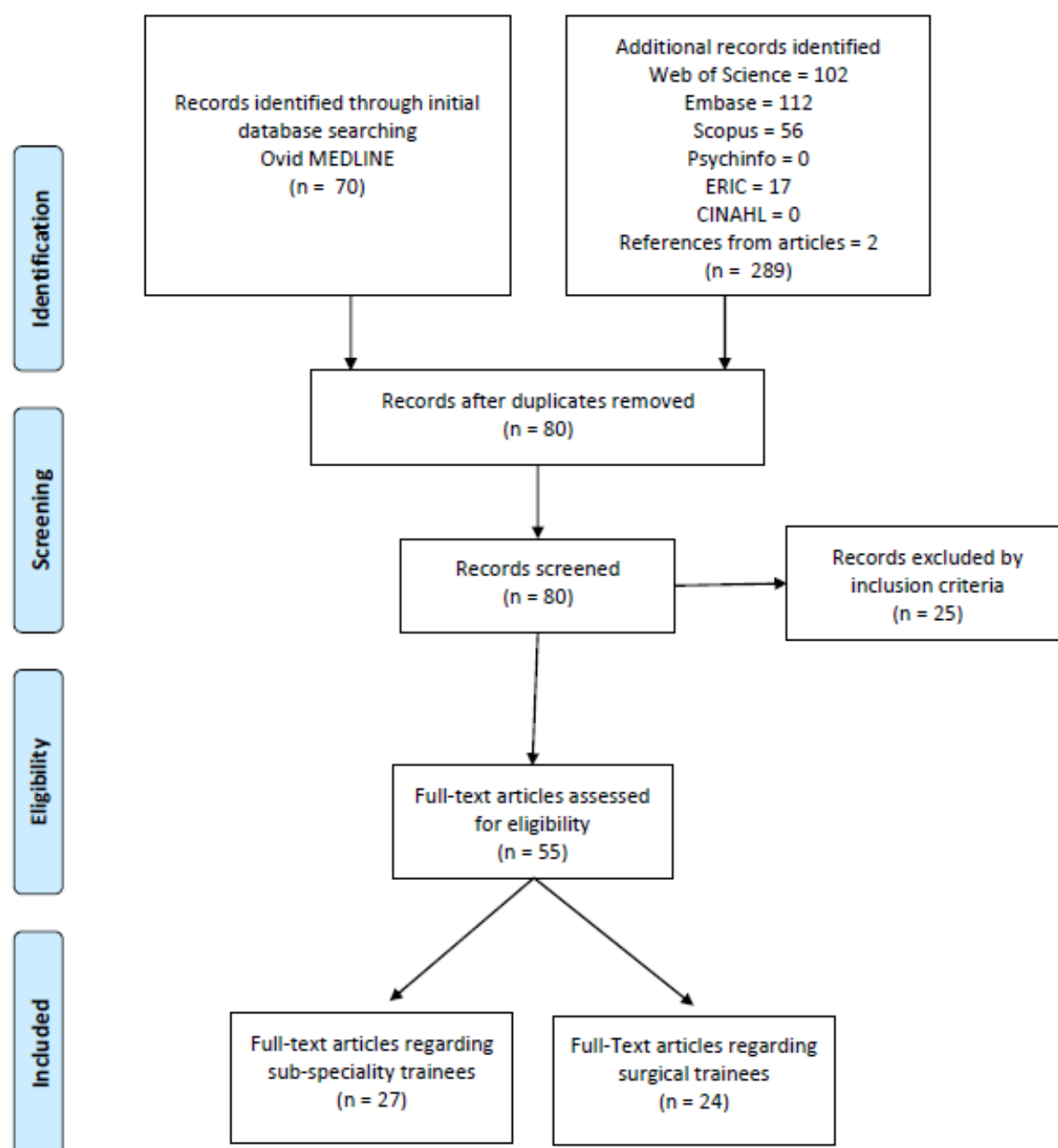


Figure 1 – PRISMA flow chart of screening of articles on the remediation of underperformance of sub-speciality and surgical trainees (59).

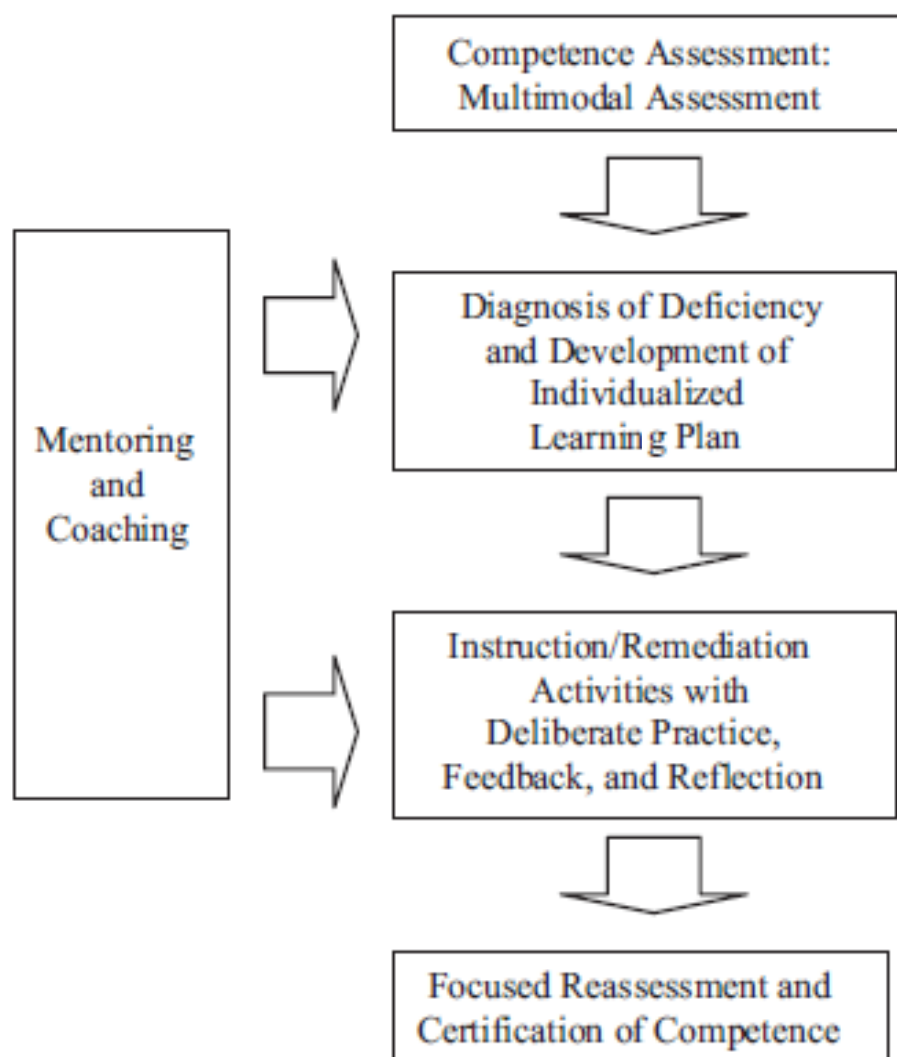


Figure 2 – An example of a framework for remediation of underperformance in medical education (54).

Table 2 – Summary of remediation process and approaches

Avoid stigmatising the trainee
Intervene proactively, do not rely in their initiative
have Collect relevant data including exploring multiple causes of underperformance
Use targeted, individualised processes within a framework, that includes regular reassessment and tangible outcomes
Provide a support structure around the trainee
Develop compassionate mean for alternative pathways
Follow up the trainee long term

Table 1 – Summary of system level issues and specific strategies for effective remediation

<i>Trainees often need remediation</i> Strategy 1: incorporate remediation as part of the training process, perhaps as an additional zone of “training enhancement” to be accessed if required	Develop a sub-group of surgical educators/trainers within the community of surgeons to resource these suggestions
<i>Selection has not identified trainees who need remediation, or who drop out</i> Strategy 2: Match the selection assessment process with the training assessment process by evaluating competencies by similar tools and methods	
<i>Supervisors feel inadequately supported to perform remediation</i> Strategy 3: Provide recognition for remediation efforts, and enhance supervisor development and support	
<i>Trainees can meet minimum assessment requirements and have unrecognised major deficiencies</i> Strategy 4: Develop systems that aim to progressively improve learners, e.g. self-management, insight and proactivity	
<i>Legal aspects of remediation are inadequately addressed</i> Strategy 5: Recognise due processes for transparency, fairness and confidentiality	