The FRCS (Tr & Orth) is the major obstacle in higher surgical training. It is regarded as a fair but very probing examination. Passing depends on knowledge, performance on the day and a bit of luck. However, as with all exams, preparation is the key to success. That preparation should encompass not only reading to accumulate facts, but should include clinical experience, history-taking, clinical examination and, most of all, practice. This section acts as an introduction to the current format of the FRCS (Tr & Orth) and serves to provide prospective candidates with some helpful hints and top tips. This advice is based on our own personal experiences, those of our colleagues, our previous trainers and current trainees.

Examination format
The current FRCS (Tr & Orth) encompasses two sections: section 1 is the written exam and section 2 the clinical and oral exam. For further details and to ensure no further changes have been made following this publication, we suggest all candidates carefully review the Intercollegiate Specialty Board (ISB) website (http://www.intercollegiate.org.uk).

Section 1: the written paper
The ISB organize the FRCS of all the specialties at the same venue on the same day, hence be prepared for a pretty big spectacle. The section consists of two separate papers, essentially a multiple choice question (MCQ) paper and an extended matching question (EMQ) paper. Paper 1 starts with 12 questions concerning a published clinical paper, followed by single best answer questions (SBAs). Two hours is allocated, plus 15 minutes of reading time. Paper 2 consists of EMQs over 2 hours and 30 minutes.

Section 2: the clinical
This section comprises clinical cases and structured oral interviews. The clinical component is broken down into three upper and three lower limb short cases, each of 5 minutes’ duration (30 minutes in total) and two intermediate cases of 15 minutes each (which can be upper limb, lower limb or spine). The oral component is broken down into four, 30-minute viva sections:
- Adult elective orthopaedics, including spine
- Trauma, including spine
- Paediatric orthopaedics and hand surgery
- Applied basic sciences related to orthopaedics.

Marking
At each scoring opportunity, each candidate is marked by the examiner from 4 to 8, and this equates to the following:
- 8 (exceptional pass)
- 7 (good pass)
- 6 (pass)
- 5 (fail)
- 4 (poor/complete fail).

In more detail:
- 7 – very good answer, no hesitation or gaps in knowledge. Able to demonstrate excellent command of the literature to the examiners. Polished and articulate answers. A candidate has to do extremely well. Able to prioritize. Goes beyond the competency questions. Gives patient confidence quickly. Good awareness of patient’s reaction.
- 5 – some hesitation, not answering the point of the question. Waffling a bit. Surface knowledge and not able to go beyond the basics. Has rote learnt rather than understood the topic. This mark gives a candidate a...
The issue of the marking is tricky. There is very little information available and most trainees do not know the process in any great detail. The following is our own interpretation of the marking system (Figure 1.1). It makes a few assumptions, but we believe it to be fairly representative.

We know that each candidate is marked 96 times in section 2 and the total mark attainable is 960, with a pass mark of 576 (60%). This is implied from the fact that a 6 at each scoring opportunity indicates a pass, and the pass mark is 576 $(6 \times 96 = 576)$. Note that there is no deliberation in these marks. If you get 575 you will fail; and this has happened to candidates in the past.

The clinical and the viva are weighted equally, implying 12 scoring opportunities for each section. Each intermediate is weighted to 12 scoring opportunities The candidate is marked on appearance/approach/history, examination and discussion; with (we believe) 4 marks for each.

$$\text{(i.e. } 4 + 4 + 4 = 12)$$

In the short cases the candidate is marked twice by each examiner for each of the 3 cases

$$\text{(i.e. } 3 \times 2 \times 2 = 12)$$

In each viva the candidate is asked 3 scenarios by each examiner (6 scenarios in total), and each examiner marks each scenario.

Implying 12 scoring opportunities

$$\text{(i.e. } 3 \times 2 \times 2 = 12)$$

The clinical and the viva are weighted equally, implying that the candidate is marked 48 times in the clinical and 48 times in the viva. In the viva it appears that each examiner marks each scenario and, as there are at least six scenarios in each viva (three from each examiner), this implies 12 scoring opportunities $(6 \times 2 = 12)$. In 2 hours (120 minutes) eight examiners can independently assess each trainee on a total of 24 topics, with each topic represented by a clinical scenario, and generate 48 test scores, which should provide a valid and reliable measure of a candidate’s ability in terms of professionalism, patient case, knowledge and judgement and quality of response. For the clinical the scoring is a little less clear; however, the intermediate and short cases are equally weighted, implying 12 scoring opportunities for each section.

The proposed marking system may be slightly confusing but the important take home points are:

- There are equal marks for the clinical and viva section, and equal marks for the intermediate and short cases, and these are marked on a scale of 4–8. We think the 4–8 scale of marking is the most important part to understand, and the precise number of times a candidate is marked is less important. Finally, several co-authors believe that a 4 probably equates to a score of 0, a 6 equates to a pass, 60%, and an 8 to an exceptional pass, probably 100%. Despite some disagreement, there was strong opinion from several co-authors that we should include this information for completeness.

- The scoring system is open to considerable speculation and interpretation. For example, what is needed for an 8? How large is the difference in performance between a 6 and 7? How bad do you have to be to score a 4. If you get an outright fail (i.e. a 4), it is extremely difficult to compensate for it with a good score in another section owing to the graduated nature of the scale.

Whatever way you look at the scoring system there is a concern amongst examiners that some candidates may be getting the wrong advice regarding examination tactics. It appears that candidates at various courses have been instructed to aim for a steady 6 where, in fact, they should be aiming for a 7. Invariably a performance in one part of the exam may drop down a mark, so going for a 7 means you will still pass with a safe 6 but, in aiming only for a 6, you may drop down to a 5 and fail the exam.
The examiners also stress that the oral examination is about principles of orthopaedic practice and management and not about stalling for time or evading the answer. For example, if a scenario of polytrauma is presented by the examiners of an open comminuted tibial fracture and coexisting pelvic fracture, the first comment should not be that you would send it to a trauma centre. This answer will just irritate the examiners – far better to go through the principles of how you would actually manage this patient. The second comment should not be an attempt to stall and focus exclusively on ATLS principles, especially if these have already been covered in an earlier question.

Another point to make is that immediately after each intermediate case, shorts or viva, the marking sheet is collected. Hence subsequent examiners do not know how you’ve performed previously. So if you think a case has gone badly, embrace it and move on, as you still have everything to play for!

Preparation advice

The aim of the exam is to assess whether you have the knowledge to practise safely as a consultant orthopaedic surgeon. Unfortunately the syllabus is vast, so you can be asked almost anything! Thankfully the examiners are not looking for minutiae, but are assessing your breadth of knowledge, so give concise, structured answers. To give yourself a fighting chance of absorbing as much information as possible, start early! A minimum of 6–12 months of intensive work is needed to talk with confidence to your examiners.

Controversially, some candidates may be advised to take up a less busy registrar post in the 6 months or so prior to the exam to give themselves more time for study. This can work the opposite way in that a busy post may provide a lot of additional clinical experience that may prove useful in the exam. What probably isn’t a good idea is to be travelling long distances to and from home each day in the 6 months before the exam. Even in this situation, previous candidates have still managed to use travelling time effectively by listening to orthopaedic discussion/tutorial type CDs in the car. Starting up new research projects and attempting to publish research papers in the six months prior to the exam is really not advised or recommended except in exceptional circumstances. Revision is a very personal issue and most people have their own style of studying, but as there is so much to cover it is important to make timetables and set goals. It is necessary to pace yourself, as you don’t want to peak too early and burn out. It is important to make time for family and still have an active, although less busy, social life. You cannot work consistently for a whole year without taking any breaks, playing sports, etc., as this will be counterproductive.

Assess your own strengths and weaknesses: if you are lacking experience in a particular subspecialty, attend clinics in those areas and enrol on specific courses. Currently there are a number of excellent revision courses in areas such as spine, hand and paediatrics for the FRCS (Tr & Orth).

It is advisable to start a small reading group (three is an ideal number). Choose like-minded individuals with whom you get on! A group will allow you to compare your progress and share your anxieties. It is also useful to focus your studying and bounce ideas off each other. When it comes to studying for section 2, your reading group can provide you with clinical and viva practice. However, to be truly prepared, put yourself in the same situation that you will face in your clinical cases and across the viva table. The exam is an expensive way to practise if you fail first time. This preparation can be done by attending FRCS (Tr & Orth) practice courses or in mock sessions arranged within your hospital or region. Be confident at interpreting radiographs and scans (befriend a radiologist if need be). Practise drawing pictures to demonstrate your knowledge, e.g. cross-sectional anatomy and stress–strain curves. Most importantly, spend time talking to previous candidates about their experiences and obtain advice from senior consultants and examiners.

Polish up your clinical skills. Each time you see a patient try and deal with him/her as a short or intermediate case. Practise getting straight to the point in your history, as you only get 5 minutes for this in the intermediate cases, and become slick at doing a thorough examination. It is helpful on occasion to have somebody watch you doing this; be it your consultant, educational supervisor or senior colleague. Be confident in eliciting clinical signs without hurting the patient; this is a deadly sin and you will be failed. Always be courteous and respectful to the patient.

Although it is not essential to quote specific papers from the literature, it is helpful to know a couple of key papers in each topic, especially in controversial areas. It is advisable to know important national guidelines, in topics such as fractured neck of femur patients, open tibial fracture management and osteoporosis, for example. This will easily convert a pass to a good pass.

The event itself

Book yourself into a decent, comfortable hotel and ask for a quiet room. Remember that you’ve already forked out near enough £2000, so don’t be a cheapskate now – you’re worth it! Be aware, however, that the nicest hotel is usually where the examiners stay! Get an early night and go easy on the coffee and alcohol, as you want to be at your best.

On the day, give yourself plenty of time to get to the venue. Dress conservatively as you do not want to stand out in any way; avoid garish ties and ostentatious suits! You will probably have to go ‘bare below the elbows’ to comply with infection control policy; so your gold cufflinks are probably best left at home! Remember, you are marked on your general appearance and demeanour. Watch what you eat before the exam – you don’t want to be filling the exam hall with the aroma of garlic, curry or fags. Nor do you want to be too liberal with cologne or perfume; you are trying to get an exam, not a date!

In summary, preparation is the key to success. Good luck…
Leopards have changed their spots

In the first edition of this book the term ‘a spot diagnosis’ was applied to a number of clinical and viva situations. This basically meant that the diagnosis was obvious and as a general rule the candidate just stated the obvious and then perhaps talked around things or possibly moved on to another case or subject depending on what the examiners wanted. This has all changed with the new exam format.

Short cases

Previously if you were doing really well you could end up examining eight or nine cases. These would include two or three spot diagnoses:

EXAMINER: What is the diagnosis?
CANDIDATE: Dupuytren’s contracture.
EXAMINER: Good. That’s fine; let’s go on to the next case.

Or

EXAMINER: Examine this man’s hand.
CANDIDATE: On inspection this gentleman has Dupuytren’s disease. There is nodular thickening of the palm and palmar skin changes of pits and nodules. There appear to be cord-like structures extending from the palm into the little and ring fingers. These fingers appear contracted into the palm.

EXAMINER: (Interrupting) Does he need surgery?
CANDIDATE: Yes. He has more than 30° MCP joint contracture.
EXAMINER: Let’s go on to another case.

There is no ‘spot diagnosis and move on’ any more!

Today’s exam format means that you examine three short cases only and spend 5 minutes with each case. You may spot the diagnosis immediately and can tell the examiners what it is but you will still spend 5 minutes examining and discussing the case regardless.

So, for the above example of Dupuytren’s contracture you may want to get straight to the nub of the diagnosis and tell the examiners that the case is Dupuytren’s disease. However, you will still be expected to examine the hand, discuss the indications for surgery, consenting issues, etc., and will not be allowed to move on until 5 minutes is up. There are no additional cases to examine; you will not see four cases even if you are doing really well.

Trauma

The rapid fire 20 X-ray oral with common bread and butter fractures has gone. This is a shame as it was an enjoyable oral if you had worked in a busy trauma unit and knew your stuff from doing lots of fracture clinics.

You will now be asked three cases which are usually complicated, and are designed to stretch you. If the question appears simple, it may have a twist or you may have missed something. For example, if it is a tibial fracture for nailing, you will have to ask for additional views as the posterior malleolar fracture will not be seen, etc.

Paediatrics

Likewise the paediatrics oral where lots of clinical photographs were shown is gone; essentially the scenario of a spot diagnosis followed by a brief discussion of management has finished. Again there are three questions lasting approximately 5 minutes each. One question is invariably one of the big three (SUFE, DDH or Perthes), one question is usually on paediatric trauma and one final question is perhaps on Brodie’s abscess, intoeing, CP, etc.

This format is similar for the hand, basic science and general adult orthopaedics orals.

From the above it is reasonable to assume:

- Questions chosen for the oral should contain enough material for the candidate and examiners to discuss for 5 minutes without running out of steam
- If you can’t respond to a question because you don’t know the answer and only 30 seconds have elapsed out of the 5 minutes, the examiners can ask you a reserve question. You will score a four even if you answer the reserve question exceptionally well, and it becomes very difficult to make up these lost marks in the exam
- If you are doing really well you may reach the reserve fourth question and you will be picking up bonus marks
- Examiners have a list of points that they need to cover with each question and a model answer for reference. Marks are scored when candidates answer correctly the points that are asked
- There may be a series of candidate prompts to which the examiners can refer on the model answer form. The examiners use them if the candidate is straying widely off the mark with their answer to bring the candidate back to the main thrust of the question
- The change in format allows a more standardized uniform objective examination to be undertaken rather than the examiners asking whatever subject they fancy  
- Some examiners believe that it is more difficult to examine candidates using this new system than the old ad hoc method. Spontaneity is lost and examiners may refer too much to the model answer for guidance rather than let the discussion take its course
- Most candidates prefer the new system as it is perceived to be more impartial and fair than the older method
Candidates will be compared to their peers. Ten or so candidates being asked the same set of questions by the examiners will invariably mean they will be ranked in order of performance.

**FRCS (Tr & Orth): change for the better or change for the worse?**

The exam format has drastically altered since the halcyon days of the early millennium.

In the old format examiners usually stayed around and examined for both the clinicals and orals. Now different sets of examiners take candidates for either the orals or clinicals but not both. Newer younger examiners are used in the orals whilst the clinicals are left for the older more experienced examiners.

The examiners for the orals are not specialized within that subject. In the past in the hand oral you were examined by a hand surgeon, the paeds oral was taken by a paeds surgeon, etc. This was changed around 2007 and now a hip surgeon may oral you on hand topics, a spine surgeon on paeds topics, and so on. The inference is that you would only be expected to know hand knowledge to that standard as a newly qualified candidate to the required standard in the hand oral. Unfortunately a busy hip surgeon may struggle to read up huge amounts of hand-related topics although there is probably no cardinal line or allow a hip surgeon to probe a gold medal candidate to the required standard in the hand oral. The exam format has drastically altered since the halcyon days of the early millennium.

Candidate feedback suggests that candidates may know the subject in much greater detail than these generalist examiners. The generalist examiners have a standardized answer set out in front of them, with a marking scheme to score whether a candidate covers the required points in the question.

This change will prevent a hand surgeon probing in too much detail on a hand topic that he/she is an expert in and losing sight of the bigger picture. It will not, however, prevent a hip surgeon getting mixed up and confused with Kaplan’s cardinal line or allow a hip surgeon to probe a gold medal candidate to the required standard in the hand oral. Unfortunately a busy hip surgeon may struggle to read up huge amounts of hand-related topics although there is probably no need for this if the answer is in front of you. We believe it is a retrograde change in the FRCS (Tr & Orth) exam, although by the time you read this introduction the exam will doubtless have changed again. Quite possibly if you read this introduction in 20 years’ time the exam will be completely unrecognizable in its present format.

1) In November 2006 there was a change in terminology with the previous viva examination now referred to as the oral examination. We have used oral exam in this book, as this is the official terminology used in the Intercollegiate Specialty Board regulations. However, the oral examination is still almost invariably referred to in the viva exam as we all seem to be more comfortable and familiar using this term.

2) If you make a big mess of one question that you really should know you would probably end up marked with a 4. You will need to make up for these lost marks by scoring two 7s. Scoring a 7 is very difficult.

3) There is a worry that failing one oral topic very badly with a 4 means that you fail the oral and the exam. This is very simplistic and the real exam situation is much more complicated. You will fail the oral unless you score two 7s, which is unlikely. If you score two 6s you need to score two 7s somewhere in the exam – not impossible but because of the closed marking very difficult.

**FRCS (Tr & Orth) dry run**

The exam is an expensive way to practise, but there are other exams that can be used to practise for the FRCS (Tr & Orth), namely the SICOT diploma and the EBOT. Several candidates use these exams as preparation for the FRCS (Tr & Orth) exam and pass them. The advantage is more letters after your name as well as preparation for the FRCS (Tr & Orth) exam. Their cost is not any more than many courses around.

**Recommended reading**

The choice of textbooks is very much a matter of personal preference. There is no official reading list and there is a growing number of orthopaedic books on the market. Having said that, there is unfortunately no perfect book for the FRCS (Tr & Orth), and it will be necessary to glean information from a variety of different sources.

Orthopaedic textbooks are expensive, and it is worth taking time before choosing. Get advice from trainees who have recently sat the exam and, if possible, borrow books to look through and decide whether they suit your style of learning. Failing that, you can browse in a good bookshop or using the ‘look inside’ facility available on some online bookshops.

Perhaps your most important purchases will be a good general textbook and a surgical atlas. Make these choices early and get to know them. Most people need around 12 months of intensive revision before sitting the exam, so make these two major purchases 2–3 years before you plan to sit it. That way you can become familiar with your books in plenty of time, and still have time to change them if they don’t suit you. You can then supplement them as required with smaller, more specialized books as time goes on. Of course, if you buy all your textbooks right at the beginning of your training, they may begin to become dated by the time you actually sit the exam.

Printed textbooks are increasingly being supplemented by online resources. These are sometimes (but not always) free and are in theory more easily kept up to date. Remember, however, that there is a less strong ‘peer review’ process to anything that appears online and the quality is variable. In general, regard the majority of online sources as supplements rather than replacements for a good quality general textbook.

There is a definite balance to be struck between using too many sources of information superficially and concentrating on too few. As a general rule, change books or add to them only if there are significant advantages to be gained. If the style...
Section 1: The FRCS (Tr & Orth) examination

or content of a book does not agree with you (it is sometimes difficult to tell until you start actually to use it), discard it quickly and move on to something more suitable. In the early stages of training, it is worth reading up on the specialties to which you are attached – what you are reading will make much more sense, and will be more likely to ‘stick’ if it correlates with what you are seeing during the day. As you approach the exam, however, most people find it helpful to work out a study schedule to avoid running out of time and missing important topics.

Included below is a list of suggestions for the various categories. Full details are given at the end of the chapter.

1. General textbooks

Miller’s Review of Orthopaedics is the standard text used by most trainees. It is very compact, but extremely terse, and not necessarily easy to read except in small doses. Because of its size, it does assume a fair bit of prior knowledge. Some topics are covered in more depth than others, but it is reasonably comprehensive, with chapters covering basic sciences, anatomy and statistics as well as the more ‘clinical’ topics. Most people find it more useful later in their reading, when they already have a bit of knowledge to build on.

The AAOS Comprehensive Orthopaedic Review is at the other end of the spectrum. It comes in three volumes and is much more comprehensive, but it is expensive and less compact. It’s probably worth looking at and considering as an alternative to Miller’s if you struggle with the note-like form of the latter. Online sources such as Wheelless’ or Orthoteers may be useful supplements. The latter is probably better, and has the advantage of having a more British slant, but it requires a fairly hefty subscription.

At the beginning of training, Apley’s System of Orthopaedics and Fractures is a good introduction, but you will need something much more detailed for the exam.

2. Surgical atlas

Hoppenfeld’s Surgical Exposures in Orthopaedics has become the standard atlas for the FRCS, and it is good. Having said that, Tribulian’s Atlas of Surgical Exposures of the Upper and Lower Extremities was a personal favourite owing to the clarity of the illustrations, text and layout.

Briggs’ Operative Orthopaedics is a fairly basic textbook which some people have found useful in tying things together. If you need a little bit of anatomy revision, it’s worth looking at a copy of Instant Anatomy. It has very succinct summaries of the courses and branches of nerves and blood vessels, and other such reminders.

3. Journal reviews

Review articles in the major orthopaedic journals are, of course, much more up to date than the information in textbooks. It’s worth reading the review articles that appear in both editions of the Journal of Bone and Joint Surgery (your examiners probably will have!). The Journal of the American Academy of Orthopaedic Surgeons is in effect a dedicated review journal. The articles are well written and appropriately detailed for the FRCS (Tr & Orth). If you have an online subscription or a library of back issues, it forms its own textbook with articles on almost any topic you need. We found it particularly useful in our studying.

4. Original research

At the very least, keep up with the original research published in the British and American editions of the Journal of Bone and Joint Surgery. Near the beginning of your studying, start working your way systematically through the past couple of years, and make brief notes (or annotations on the contents pages) of any important articles. You will then have a useful resource for revision and ‘cramming’ in the weeks before the exam. You don’t need to memorize all the details, but knowing something about the major recent papers is important. Other journals to keep an eye on include Clinical Orthopaedics and Related Research and some of the specialty journals.

5. Clinical examination

Harris’ Advanced Examination Techniques in Orthopaedics is the most widely used book, although it is perhaps a little basic and some chapters are clearer than others. Some people have found a good clinical examination course to be as good as anything, and of course nothing makes up for lack of practice when it comes to clinical examination. Reider’s Orthopaedic Physical Examination is useful as a reference if you’ve got it in your library, but it’s probably a bit expensive to recommend buying.

6. Basic sciences

Ramachandran’s Basic Orthopaedic Sciences has become the standard book, and is well worth getting. It is reasonably clear and detailed, particularly if you supplement it with the basic sciences chapters from a general book such as Miller’s.

Einhorn’s Orthopaedic Basic Science is a more detailed text. If you have access to a copy, it may be useful as a reference source where you need more explanation, but it probably doesn’t need to be read cover to cover.

7. Paediatrics

Staheli’s Practice of Pediatric Orthopaedics or Joseph’s Paediatric Orthopaedics are reliable options. Some people found Pediatric Orthopaedic Secrets, also by Staheli, good for viva practice, although we found it less helpful.

8. Hands

Hand Secrets is an option, although again the format of this series appeals more to some people than to others. An alternative is to use relevant chapters from a reference book such as Green’s Operative Hand Surgery, but you will need to be selective.
9. Trauma

Egol’s *Handbook of Fractures*\(^1\) is recommended as a reasonably concise and up-to-date text. Most trainees find that trauma is one of their stronger areas, and many people simplify their experience by looking up specific topics in a reference text such as Rockwood and Green’s *Fractures in Adults and Children*\(^2\,3\) or Browner’s *Skeletal Trauma*.\(^4\) Be careful not to get lost in these massive tomes, however!

10. Statistics

Many basic sciences or general orthopaedic books (including Ramachandran\(^1\) and Miller,\(^1\) respectively) have useful chapters on statistics. We also found selected chapters from Greenhalgh’s *How to Read a Paper*\(^5\) useful.

11. Question Practice

The AAO’s *Comprehensive Orthopaedic Review*\(^2\) comes with a useful MCQ practice book. *Review Questions in Orthopaedics*\(^24\) is also recommended, although currently out of print – it may be possible to borrow one or buy one second hand. Both these books do have a slightly American slant. British books include P. Sharma’s *Practice Questions in Trauma and Orthopaedics for the FRCS*\(^25\) and H. Sharma’s *1000 EMQs in Trauma and Orthopaedic Surgery*,\(^26\) but neither of these books really reliably recreate the questions found in the real exam and they have been found to be of limited use by those who have used them. There is an increasing number of websites with banks of questions that can be useful practice. See for example *Orthobullets*\(^27\) or some of the websites run by large implant companies for which your local rep will give you a password.

12. Reference

Campbell’s *Operative Orthopaedics*\(^28\) and the Oxford *Textbook of Trauma and Orthopaedics*\(^29\) are useful reference sources when you can’t find the answer elsewhere!
Section 1 is the written theory part of the FRCS (Tr & Orth) exam. The format of the written test has changed since the first edition of the book. Section 1 now consists of two papers.

Overview

Paper 1
- Single best answer paper [SBA] (2 hours + 15 minutes reading time for published paper)
- 110 multiple choice questions (single best answer format; one from five)
- The first 12 questions in this paper relate to a published paper.

Paper 2
- Extended matching item paper [EMI] (2 hours 30 minutes)
- 135 multiple choice questions (extending matching item format).

There is NO negative marking, therefore all questions should be attempted. Sample questions can be viewed at www.intercollegiate.org.uk although candidate feedback suggests these are neither particularly helpful nor representative of the real test.

A candidate’s final mark is determined by the mean combined [SBA/EMI] marks achieved in paper 1 and paper 2. Experienced examiners perform a formal process of ‘setting the standard’ and this sets the pass mark for each paper.

The standard setters estimate the highest score for a trainee to fail and the lowest score that would allow someone to pass. Once agreed (this is often done by taking median values between the highest and lowest estimates) these two values are plotted on a graph (Hofstee’s method). The standard setters then agree on the highest and lowest acceptable percentages of failing trainees. They may agree that a zero failure rate would be acceptable but that no more than 20% of trainees should be allowed to fail. This is plotted on the graph as the other axis. The graph contains a rectangular area based on agreed values and where a line drawn from upper left to lower right intersects the graph determines the standard (pass mark).

Eligibility to proceed to the clinical component of the examination (section 2) will be the mean of the two marks set by the standard setting process. The details of criterion referencing/standard setting are not made public. There needs to be a spread of difficulty to the questions to differentiate between candidates. An easier paper will require a higher mark to pass. In February 2010, the pass mark was around 67%. A question can be graded on difficulty by what proportion of candidates just passing the exam would be expected to achieve the correct answer.

The SBAs/EMIs are subject to quality assurance procedures through both examiners comments and candidates feed back. Difficulty level, discrimination index and internal consistency are analysed.

Although the written paper is hard to pass it is still regarded as the easiest part of the examination to get through. The Intercollegiate Specialty Boards (ISB) site contains a link to advice on format and structure of test questions. Websites like Orthohyperguide and Orthobullets contain a large number of single best answer questions.

It is useful to have some idea of how MCQs are constructed, what they set out to test, avoiding ambiguity with stems, use of distracters placed in the stem to change the entire meaning of the question, etc., but the book is very detailed and complicated and is perhaps more relevant for the examiners constructing the questions than the candidates.

Paper 1
The first paper is 2 hours and 15 minutes and comprises multiple choice questions (MCQ single best answer, one from five). The paper consists of 110 single response questions. In the first 15 minutes you will be given a copy of a published paper. You are expected to read the paper during this time and are not allowed to open up the exam sheets. After 15 minutes the invigilator will give you a time check and only then can you open the question and answer sheets and get started. There will be 12 questions based on the published paper. The remaining 98 questions are from various aspects of orthopaedics and trauma. There will be questions based on clinical scenarios, basic sciences, anatomy and surgical approach. The vast majority of questions
will be trauma-related, especially spine and pelvic trauma. Anatomy accounts for a large number of questions. It is equally important to have a good knowledge of medicolegal and medical ethics aspects. In both parts of the FRCS (Tr & Orth) exam candidates have been asked to discuss topics such as confidentiality, consent, GMC good medical practice, Jehovah’s witnesses (blood transfusion) and child protection.

Multiple choice questions (MCQ single best answer, one from five)

The SBA question consists of an introductory theme, a question stem followed by five possible responses (A–E), of which one is the most likely suited answer to the question.

A few examples are given below:

1. A 30-year-old woman presents to you with a comminuted fracture of radial head. What is the best management option for this lady?
   A. Conservative method
   B. Open reduction and internal fixation
   C. Radial head replacement
   D. Closed reduction and percutaneous K wiring
   E. Early mobilization

2. A 73-year-old woman is seen in the clinic with a pathological fracture of first lumbar vertebra. She has previously been diagnosed with metastatic breast disease and has been given a life expectancy of 1 month. What is your treatment plan?
   A. Pain relief and supportive care
   B. Radiotherapy
   C. Chemotherapy
   D. Vertebroplasty
   E. Posterior instrumentation

3. A 23-year-old sustained a penetrating injury to the sole of the foot while playing a game of tennis. What are the commonest infecting organisms?
   A. Staphylococcus aureus
   B. Pseudomonas spp.
   C. Escherichia coli
   D. Proteus spp.
   E. Staphylococcus epidermidis

4. What is the root value of adductor longus?
   A. L1
   B. L1 and L2
   C. L1, L2 and L3
   D. L4 and L5
   E. L4, L5 and S1

5. A 43-year-old man has back pain associated with EHL weakness. Which intervertebral disc is likely to be prolapsed?
   A. L2/L3
   B. L3/L4
   C. L4/L5
   D. L5/S1
   E. L1/L2

6. The radial nerve passes between which two muscles:
   A. Long and medial head of triceps
   B. Biceps and brachialis
   C. Pronator teres and FDS
   D. Brachialis and brachioradialis
   E. Teres major and teres minor

7. Which has the highest Young’s modulus?
   A. PMMA
   B. Titanium
   C. Stainless steel
   D. Cortical bone
   E. Ceramic

8. The most common cause of dropped little and ring fingers is:
   A. Tendon rupture
   B. Radial subluxation of extensor tendon
   C. Ulnar subluxation of extensor tendon
   D. Neurological causes
   E. Trigger fingers

9. Which of the materials below is used as a bone graft substitute?
   A. Tantalum
   B. Titanium
   C. Co-Cr
   D. Aluminium
   E. Ceramic

10. Which muscle has a dual nerve supply?
    A. Brachioradialis
    B. Brachialis
    C. Abductor pollicis brevis
    D. Pronator teres
    E. FDS

The time management in this section is very important. You have only 1 minute to read the question, which in some cases will have a long stem, and to mark your answer. If you do not know the answer, mark the question, so that you can come back later if time permits or mark an answer that you guessmate is the correct answer.

Candidate feedback suggests that approximately 20% of questions are straightforward. These questions test standard textbook knowledge and answers can be easily narrowed down to two choices. The remaining questions are less obvious, stems are tricky and the question needs thinking about, i.e. they are difficult questions especially if you are underprepared.

Advantages of SBA’s include:

- SBAs can assess a wide sample of curriculum content within a relatively short time period. This leads to high reliability and improved validity.