



## Using Body Painting and Other Art-Based Approaches for the Teaching of Anatomy and for Public Engagement

Gabrielle M. Finn

Body painting is considered by some to be the most ancient form of art. Origins of body painting stem from tribal cultures and are ceremonial. Body painting is now most frequently seen on the face, usually at sporting events or children's parties. However, body painting is now being used in the medical setting as a way of projecting the inside on to the outside.

Body painting is an innovative method of anatomy teaching. Op Den Akker et al. [1] first used body painting, described as painting internal structures on the surface of the body with high verisimilitude, during teaching in 1999. Body painting within medical education is described as painting internal structures on the surface of the body with a high degree of detail [1]. This contrasts with simple line drawings as used in conventional practice, which can be dated back for at least a century [2]. Body painting proves particularly useful as a method for introducing surface anatomy in medical teaching and complements the teaching of clinical skills and peer examination, including techniques such as palpation and auscultation [1, 3, 4]. The value of body painting as a teaching tool is frequently attributed to its kinaesthetic nature [3–5]. Furthermore, it is thought that the active and kinaesthetic nature of body painting, coupled with the strong and highly

memorable visual images of underlying anatomy, contribute to its success as a learning tool [1, 3, 4, 6]. Body painting has also been reported to be a valuable tool for diminishing the apprehension often exhibited by students when conducting peer physical examinations [3]. Since it has been suggested that a fear of death may be oppressive for students studying in the dissecting room and may be correlated to poor academic performance, the use of alternative teaching methods, such as body painting, may therefore be beneficial to students who struggle with cadaveric work [4, 7, 8]. Body painting has also been attributed to a mechanism by which students can be taught by stealth, with deliberate utilization of the hidden curriculum described [9, 10].

Within this chapter, the practicalities and advantages of using body paint and other art-based approaches to teaching and learning anatomy are described. In addition, the place of anatomy pedagogy within public engagement is discussed. Examples are provided, along with recommendations for anyone considering developing their own body painting session. This process of painting internal structures onto the body promotes knowledge retention, creates an exciting teaching environment and improves student engagement in their anatomical studies.

---

G. M. Finn (✉)  
Faculty of Biology, Medicine and Health,  
University of Manchester, Manchester, UK  
e-mail: [gabrielle.finn@manchester.ac.uk](mailto:gabrielle.finn@manchester.ac.uk)

## Examples of Anatomical Body Painting

### Muscles of Facial Expression and Associated Neurovasculature

Painting the muscles of facial expression is a fun activity for students. It is of particular relevance for medical, dental, physiotherapy and speech therapy students. By painting the muscles onto the face, looking in a mirror or at a painted peer and pulling various expressions such as winking, puffing out the cheeks or raising the eyebrows, students are able to immediately see the muscles in action. Other structures such as the parotid gland and neurovasculature can be painted simultaneously (Figs. 20.1 and 20.2).

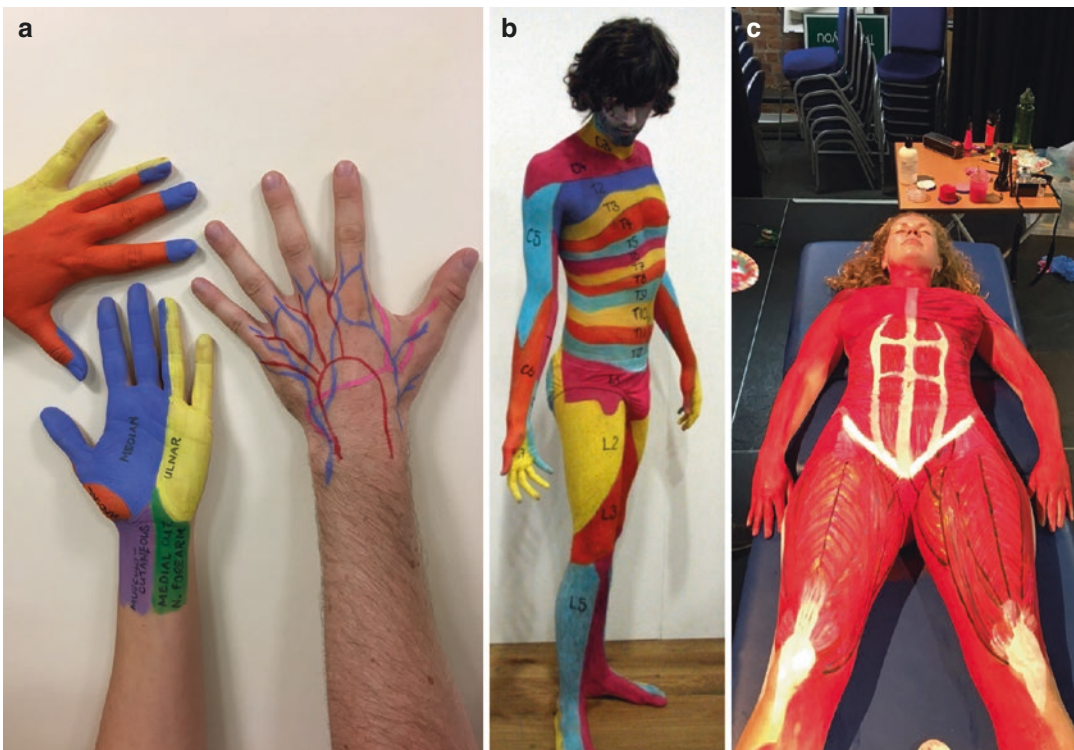
### Dermatomes

Mapping dermatomes onto skin is a great way to learn this invisible map of the body. Not only

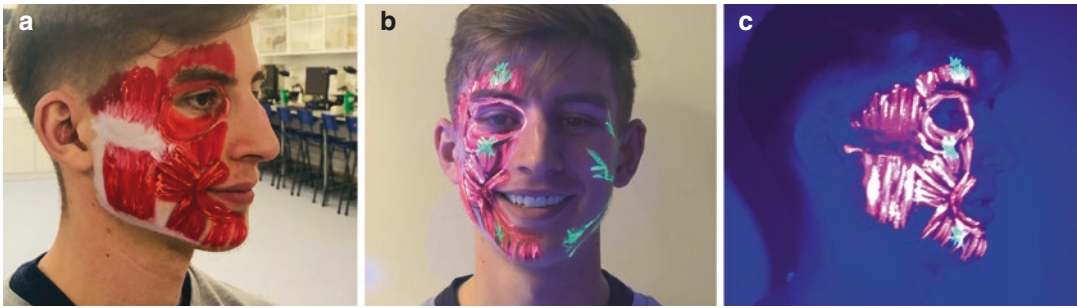
do students learn the dermatomes, but they also revise their bony landmarks, as they must palpate the relevant bones in order to correctly map the dermatomes. Dermatomes can be painted from head to toe simultaneously (Fig. 20.1), or region by region as encountered through the curriculum. Dermatome painting lends itself to the use of bright, bold blocks of colour, which is highly memorable for students. Similarly, innervation from peripheral nerves also can be mapped.

### Abdominal Regions, Quadrants and Areas of Referred Pain

A quick and easy activity for students is to paint regions of the abdomen alone, or better still, the associated abdominal viscera can then be painted in situ. This activity has much impact when students observe the relative size and positions of organs. Viscera can be painted using an appropriate anatomical colour palette, or using vibrant colours to promote subsequent



**Fig. 20.1** Normal body paint examples: (a) hand anatomies, (b) dermatomes, (c) musculoskeletal anatomy



**Fig. 20.2** UV facial anatomy: (a) daylight, (b) daylight + UV light, (c) blackout + UV light

recall. Students can paint blocks of colour to represent the referred pain from corresponding organs.

#### Topics Which Lend Themselves To Body Painting

- Abdominal viscera
- Facial muscles and neurovasculature
- Areas of referred pain
- Musculature
- Dermatomes
- Bones
- Borders of the heart and the position of valves
- Position of the lungs and thoracic osteology

Body painting has helped me to interact with individuals in a manner that is outside the normal socially acceptable level of conduct. This has helped me develop a more professional attitude towards patients and I see this as very useful. –A medical student at Durham University, UK

#### Advantages of Using Body Painting

Although body painting has origins in ancient tribal customs, it has a number of educational advantages within contemporary curriculum, and body painting has a number of contemporary advantages within an anatomy curriculum [4, 5]:

#### Creation of Learning Landmarks

Students have reported body painting as a highly motivating exercise [4]. Its main advantage appears to be the creation of what could be called “learning landmarks”: vivid experiences which are memorable in themselves and which then provide access to the educational content associated within that context [4]. In particular, students acquire a good understanding of dimensions and positions of anatomical structures using this method while studying [1]. Literature is in accordance with the idea that body painting is a highly memorable experience, which gives students an appreciation of the links between the visual, tactile and auditory aspects of human anatomy.

#### Skeletal Anatomy

Osteological knowledge is imperative for students. Painting the skeleton is a memorable task. Regions can be painted in isolation, such as the bones of the hand or an entire limb. Musculature and neurovasculature can be added if required. Bones of the hand are something that individuals can paint on to themselves, rather than having to work in pairs. An easily accessed area, such as the hand, lends itself to a painting activity with school groups, recruitment fairs or for other such public engagement events.

## Emphasis on Living Anatomy

Historically, anatomy has been taught by dissection. Cadavers are useful for studying the anatomy of large organs [11] and give an overview of spatial orientation [12, 13]. As anatomy is most commonly encountered by medical practitioners in the form of living anatomy and medical imaging [6], students should therefore also be encouraged to engage in teaching activities with an emphasis upon living anatomy and body painting is one such activity. “Clinicians often blame anatomists for teaching students too many details and not enough clinically relevant structures” [14]. Body painting allows the clinical relevance of the gross anatomy to be emphasized to students. Surface anatomy is a way of bringing cadaveric anatomy to life [15] and body painting falls into this category.

## Cost-Effectiveness

Body painting is deemed to be a cost-effective tool [9, 16–18]. Body paints and paint brushes are readily available for purchase and are relatively inexpensive [5]. Old containers can be used for storage of water; the paint brushes do not need to be specialist. Large numbers of students can engage with the activity simultaneously and require little direction once instruction sheets have been produced, making the activity cost-effective in terms of both staff time and physical resources.

## Positive Learning Environment

Even for the most reserved student, it is rare for students not to positively engage with body painting sessions. This fun activity becomes a break from the tedium of the dissecting room. Student enjoyment results in a positive learning environment and peer-peer teaching often results. As body painting is not a didactic modality for delivering teaching, its use creates positive and more relaxed relationships within the classroom between faculty and students [4, 5]. Body paint-

ing diffuses the formal learning environment and the sometimes challenging dissecting room context [9, 10, 17].

## Retention of Knowledge

By actively engaging in the painting process, rather than passively learning in a didactic teaching session, students’ learning becomes deep rather than surface [4, 5]. The use of bright colours aids students’ memory of the structures that they paint. The painting process is multisensory and utilizes all learning approaches simultaneously; students visualize, students paint (kinaesthetic), students read instructions aloud (auditory) and students feel the paint on their own skin when acting as the canvas (sensory). Thus, retention of knowledge is promoted. Furthermore, students often photograph their painting for revision and sentiment – both positives in terms of subsequent recall. Recent research supports the notion that body painting helps students learn by reducing cognitive load; in other words, it enables information to be efficiently processed by working memory and stored in long-term memory, thus increasing information retention and recall [9].

## Emphasis on Future Clinical Practice

During a body painting session, students must palpate bony landmarks in order to demarcate the associated anatomical structures. This has direct learning benefits for future clinical practice. Moreover, regions such as boundaries of the lungs and positions of heart valves can be painted on and lend themselves to subsequent clinical examination with the stethoscope. When dealing with peers in a state of relative undress and completing palpation and examination – students must communicate appropriately, empathize with their peer canvas and approach their peer in a professional manner; thus, skills required in the clinical environment are developed. Aka et al. explained this as the opportunity for students to form and practice their professional

scripts [10]. These body painting sessions allow integration between anatomy and clinical skills and enable the future patient to be the focal point [4, 5, 9, 18].

### An Alternative to Cadavers

One of the major advantages of using body paint is that it can be used as an alternative approach to cadaveric study on occasions where living and surface anatomy are being studied, or for students who struggle with cadavers [4]. The dissecting room environment can be one in which students who have emotional difficulties with cadavers find troublesome. Learning out of the dissecting room context can be both supportive and educationally beneficial for students who struggle emotionally. Similarly, surface anatomy is difficult to demonstrate on cadavers; for this reason, body painting is useful – it emphasizes living anatomy throughout. When time is short for dissection, or cadavers are in limited supply, faculty may wish to consider implementing body painting in their curricula. Body painting cannot entirely replace cadaveric study, but it is a powerful tool and adjunct for emphasizing the living nature of anatomy [4, 5].

### Use Outside of the Classroom

In addition to anatomy teaching, body painting can be used for a number of other uses and institutional activities. Quick and easy activities are often required for departmental open days, tours and public engagement events. Painting the hand lends itself to such an occasion as no undressing is required and participants can paint their own limbs. Bones of the hand, the dermatomes of the hand or neurovasculature can be painted within a few minutes. Prior anatomical knowledge is not necessary; participants can work from images or simple instruction sheets. Similarly, body-painted models can be used for other public engagement events, such as museum exhibitions. Entire body musculoskeletal paintings, in a non-anatomical colour palette, are popular.

### Using Ultraviolet Body Paints

UV light, invisible to the human eye, causes certain substances to glow, a capability capitalized upon to create readily available UV paints. Finn and colleagues have recently introduced the use of UV body painting into the medical curriculum [17, 19] with examples shown in Figs. 20.2, 20.3 and 20.4. The applications and advantages are as follows:

- UV paint can be layered on top of or beneath the normal body paint. This means that structures that are superficial or deep can be painted in the same view. Examples could be painting musculature in normal paint with UV innervation that will only be visible with UV light. Hiding structure names in UV also works well (Figs. 20.2, 20.3 and 20.4).
- UV paint has a wet appearance, especially with the reflection of the UV light, which gives painted structures a more visceral appearance.
- The reflection of light on painted musculature makes the structure appear to be under tension. An example of this is movement of the arm when the muscles of the chest have been painted showing tension at the points of origin and insertion. Actions of the muscles appear more obvious with this effect.
- UV is excellent for showing “hidden” maps of the body such as dermatomes, Langer lines and Blaschko’s lines. These features can be mapped on to the body and only revealed once the UV light is on.
- Student users have remarked that UV paint is more inclusive as the bolder pigmentation enables it to be better seen on darker skin tones.
- UV body painting is the most striking medium of painting and therefore is of great use when significant impact needs to be made.

Caution must of course be taken when using ultraviolet light due to the health implications. For this reason, it is recommended that UV body painting is used sparingly [17, 19]. UV paint is visible in natural light so the use of the UV lamps can be avoided but the pigmentation is more remarkable with UV lighting turned on [17, 19].





**Fig. 20.3** UV thoracic anatomy: (a) thorax muscles, (b) thoracic anatomy, (c) cardiovascular examination



**Fig. 20.4** (a) Quadriceps, (b) patellar tendon reflex, (c) UV labels, (d) UV musculoskeletal anatomy

UV body painting appeared so realistic to me. It looked wet and as if I was literally viewing the muscles move beneath transparent skin. –Audience member at an anatomy demonstration who worked as a healthcare professional.

## Designing Body Painting Teaching Sessions

Planning body painting teaching sessions can be daunting. By following these simple steps [4, 5, 17, 19], body painting sessions can be easily designed and implemented.

### Identify Your Chosen Teaching Session and Learning Outcomes

All sessions need to be constructively aligned with specific learning outcomes [20, 21], teaching activities and, where appropriate, assessment. Give careful consideration to which structures you wish the students to learn. What is the take-home message of your session and can that be achieved using body painting as opposed to dissection or a lecture? Develop one session as a starting point, and then following evaluation, move on to develop further sessions. Body painting sessions can form part of timetabled anatomy and clinical skills teaching. Body painting fits particularly well into a multi-station practicum whereby each station addresses one aspect of the body region being taught. For example, a teaching session on the anterior thigh may have the following stations: musculature, nerve supply, blood supply and osteology. When body painting is introduced into a practicum, it may form one of the stations, or become a double station if a clinical skill is being taught simultaneously. The stations for the anterior thigh session may then become a musculature, neurovasculature, osteology and a body painting station which teaches the distribution of dermatomes. Alternatively, a clinical skills session on lower limb examination or neurological assessment would work as a place to paint. In this example, students might paint

nerves or muscles with tendons and then elicit the patellar reflex, or just visualize such structures while performing a basic examination.

#### To Do

- Think about a teaching session with either gross anatomy or surface anatomy learning outcomes. How could you incorporate body painting into that class?
- Consider the environment, the resources and which body region and structures will be painted.
- Can you devise easy-to-follow instructions? Will you include images in your instruction sheets?

### Design Your Instruction Sheet

Students need specific instructions to follow to enable them to achieve the desired learning outcomes. Instructions need to be formatted as a step-by-step guide which is easy to follow. Photographic images of a pre-painted model or diagrams are helpful. Copies of the instruction sheets, presented as a checklist which students can mark off, are a good aid for regions which are more complex and have combined clinical examination. Following their first use, ask students for feedback as to whether the instructions were easy to follow. From a practical perspective, laminating instruction sheets is useful due to surrounding water and paint. With a detailed set of instructions, body painting sessions require little facilitation [16].

### Choosing Your Teaching Environment

Body painting is easily adapted to a number of teaching and learning environments. Consideration needs to be given to safety: are you using a laboratory where students can come into contact with irritants or other hazardous sub-

stances? Consider student dignity: is the interior of the room easily viewed from outside? Are the surfaces wipeable after painting? Will you be using UV paint? If so, are there blackout blinds and sockets available for lights to be plugged in. As the paints are water-based, classrooms, other than laboratories, can be utilized for painting. Students need a surface for their equipment and instructions, as well as enough space to move around their chosen student canvas.

## Sourcing Your Equipment

Body paints are often sold as children's face paints. The most important considerations are that the paints you buy are water-based and hypoallergenic. The colours you select depend on whether you wish to paint in an anatomically correct palette, such as beige, red and brown, or whether you wish to use bolder colours. Paints are available from art and craft suppliers, toy shops and the Internet. Paint brushes do not need to be specialist. Brushes can be natural fibres or synthetic – depending on your budget. It is advisable to purchase a selection of sizes of brush as some areas, such as dermatomes, require large block painting, whereas others, such as nerves, require finer lines to be painted. Makeup brushes, bought in bundles, are an economical way to get a range of sizes easily; they wash well and produce a less streaky effect than normal paint brushes. Any plastic pots will suffice for washing brushes and wetting paints during the session. Disposable wipes are ideal for removing paint from skin or work surfaces after teaching, although often students wish to keep their paint on! Wipes do not need to be for makeup but can be bought from childcare sections of grocery stores – these are much more cost-effective.

UV body paints are readily available in either a tube or crayon – they do not require any water for use. Crayons are quick and ideal for mapping neurovasculature. UV paints are premixed and applied directly to the skin; they can also be applied over normal paint for layering effects or colour saturation.

## Assigning Student Roles and Groups

Where possible, allow students to self-select their partner or group members. This eases any discomfort associated with undressing and physical examination. Some students may have a preference for the role they undertake, whether that is the painter or the canvas. Students can be encouraged to alternate roles as there are advantages to each [8]. To ensure that the canvas engages, they can read the instructions to the painter and observe the painting process in a mirror.

### Equipment Needed to Use Body Paints

- A range of coloured paints, makeup or paint brushes and/or sponge applicators.
- Eyeliner pencils for outlines.
- Body paints should be water-based and hypoallergenic.
- UV paints and crayons for an additional resource.
- Water or wipes need to be available for paint removal/mixing.
- Mirrors should be available so that the student canvas can observe the painting.
- Screens or cubicles may be needed for dignity.
- UV lamps or black light if using UV paint.

### Cross-Linking

See also the following chapters:

- Chapter 9 “Anatomy Education to the Public”
- Chapter 19 “Giving Feedback to Students”
- Chapter 26 “Promoting Active Learning in the Gross Anatomy Laboratory”
- Chapter 33 “The Use of Low-Fidelity Models to Enhance the Learning of Anatomy”
- Chapter 43 “Core Syllabi in Anatomy”
- Chapter 47 “Exploring the Hidden Curriculum and Anatomy Education”



## Tips for Using Body Painting Within Anatomy Teaching

### Use Within Both Large and Small Group Settings

Body painting use is not limited to small group settings. Sessions can easily be adapted for large numbers of students. The number of paints available and space requirements are the only limiting factors. Resource wise, students can easily share paints and brushes. Students can work in pairs, or larger groups, depending on the amount of anatomical structures to be painted and the time frame in which they must work.

### Consider Students' Sensitivities and Cultural Perspectives

The majority of students will have no hesitations in participating in a body painting session. However, as with peer examination, students may have concerns with being in a state of undress. Faculty members are advised to be sensitive to these issues, particularly to students who are body image conscious. Providing screens or cubicles helps students feel more comfortable. Some students may choose to paint on top of clothing, which works well. Allowing students to self-select the groups they work in also encourages their participation.

### Allow Photography

Permitting students to take photographs of their paintings promotes reflection and revision. Of course, caution must be used, and students should be encouraged to seek consent before photographing others. Advise students that photography is permitted in advance of the session.

### Introduce and Demonstrate

Students may be reluctant to start painting without an introduction to the topic or a quick demonstration of surface anatomy palpation. A brief overview gives students greater confidence. This can include the instructor painting a model or volunteer if time allows. Instructors should circulate as much as possible in order to reassure students. In doing so, instructor should be mindful of student dignity and comfort, especially if regions such as the thorax or abdomen are being painted.

### Give Students Feedback

During painting sessions, faculty can observe the painting and palpation being conducted by students. Timely and appropriate feedback should be given but with sensitivity and encouragement. Use this as an opportunity to engage the students in a dialogue about the learning objectives and, if appropriate, the relevance to their future clinical practice.

### Reflect on the Success of the Session

Being a reflective practitioner is an important part of the teaching process. Following painting sessions, teachers should take the time to consider the successful elements of the session and the aspects that could be improved for future iterations. Was the time devoted to the activity appropriate? Did the session fulfil the learning outcomes? Did the students engage with the painting process? Was student comfort and dignity maintained? Did students receive adequate instruction and feedback? Was the equipment provided sufficient?

### Important Considerations When Using Body Paints in Anatomy Teaching Sessions

- Provide easy to follow instructions.
- Allow students to self-select the peers they wish to work with.
- Involve the student canvas in the process by encouraging them to read the instructions aloud and by providing mirrors for them to observe through.
- Encourage students to use bold colours – this promotes retention of knowledge.
- Ensure sufficient time is provided.
- Encourage students to take photographs of their painting – this promotes subsequent recall.

## Other Art-Based Approaches to Teaching Anatomy

Body painting is just one of many art-based activities which can be readily adapted for use in anatomical teaching.

### Life Drawing

Engaging students in life drawing is particularly useful for teaching surface anatomy. Drawing provides a medium by which students can consider differing body morphologies and surface anatomy. Drawing trains students to observe the asymmetry in a body – a skill particularly useful for those going on to clinical practice. When taking the time to draw something, the artist must study the object in great detail, whether that is drawing anatomical dissections or plastic models. Due to this study, life drawing is therefore also a beneficial process for learning, in particular when considering spatial relationships between anatomical structures.

### Plasticine (Clay) Modelling

Children's reusable modelling clay (plasticine) lends itself to anatomical teaching. As

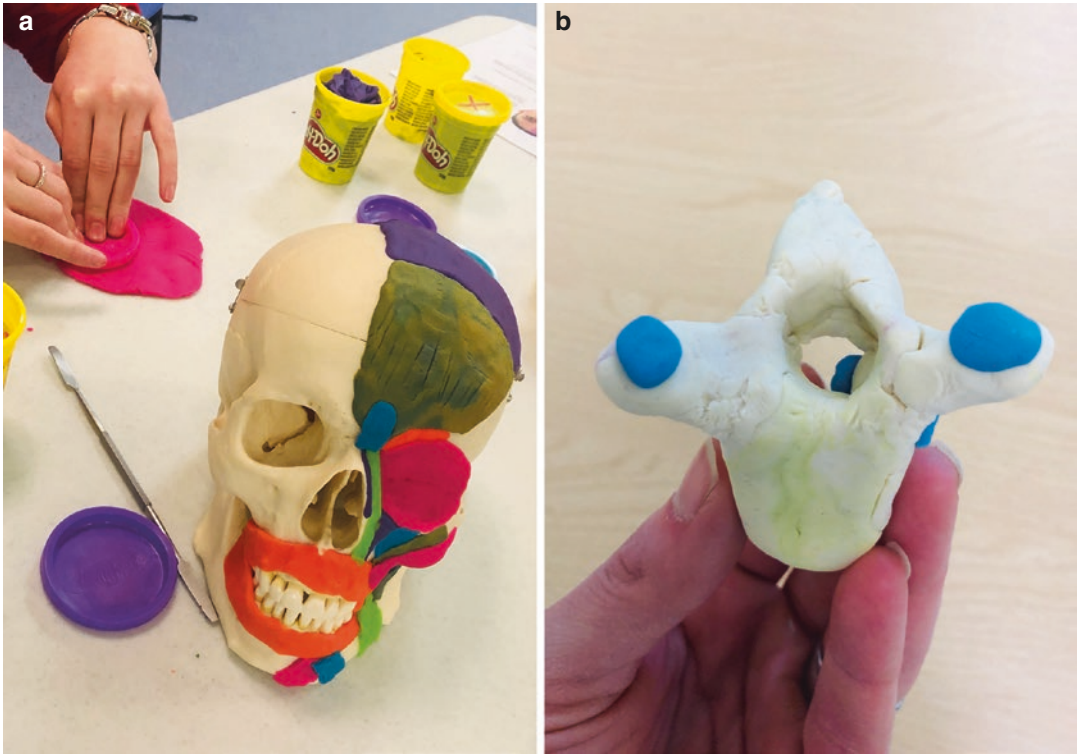
with body paints, the clay is cheap, readily available for purchase, reusable and can be adapted for use in large group sessions. Examples of its use include modelling the muscles of facial expression on to a plastic skull (Fig. 20.5), vertebrae or embryological structures. The advantages are similar to body paint in terms of appeal to a variety of learning styles, diffusion of emotional responses to cadavers and memorability.

### Anatomical Cake Baking

Studying anatomy does not need to be a task confined to the classroom; students can enjoy learning anatomy at home too. Baking and decorating foodstuffs such as cakes, bread or cookies to resemble anatomies is a fun way to study (Fig. 20.6) without reading textbooks. By depicting the anatomy, students must orientate themselves with the anatomy and relevant spatial relationships. As this task takes time, the students are reinforcing the anatomy over a prolonged period, but often without realizing they are doing so. Holding an event where students can bring in their baked items makes a great end of semester revision session.

### Pipe Cleaners

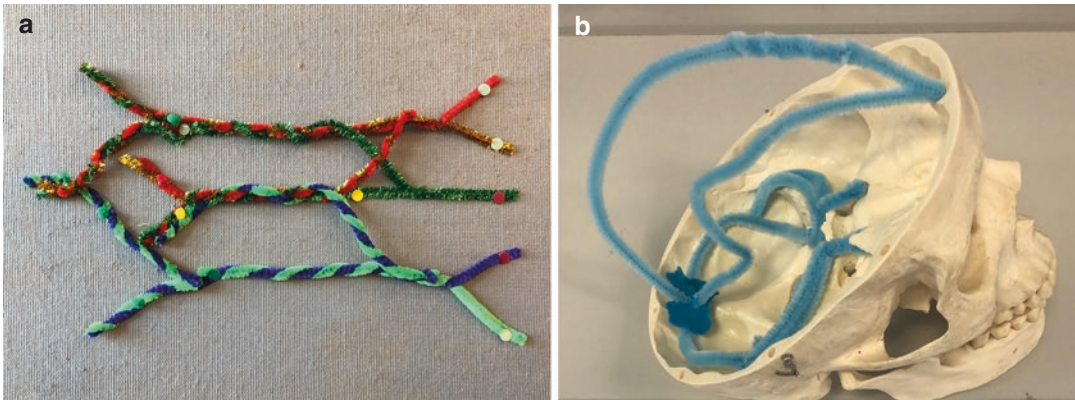
Readily available in art stores, pipe cleaners serve a number of craft purposes. Lightweight, easy to manipulate, inexpensive and available in an array of colours and effects, including patterned and glitter, make pipe cleaners ideal for quick modelling. Examples include mapping out arterial networks such as the circle of Willis or use with a plastic skull to either depict cranial nerves as they traverse foramina, or the venous sinuses (Fig. 20.7). Figure 20.7 also illustrates their use for a quick conceptual map of the brachial plexus. This activity is easy to transport and adaptable to non-laboratory environments such as a lecture theatre.



**Fig. 20.5** Modelling clay: (a) muscles of facial expression, (b) vertebrae



**Fig. 20.6** Anatomical cake baking: (a) brachial plexus, (b) hypogastric plexus



**Fig. 20.7** Pipe cleaners in use for (a) brachial plexus, (b) venous sinuses

## Conclusions

Art-based approaches to teaching and learning add new dimensions to the educational environment and to the student experience [4, 5, 8]. Body painting remains one of the most popular art-based modalities employed within anatomy education. Body painting is a useful tool for learning gross and surface anatomy. It actively engages students in the learning process and enables long-term retention of knowledge. The use of bold colour promotes memorability and adds an element of fun. Utilizing body painting encourages students to confront issues associated with clinical examination such as vulnerability, communication, professionalism and body image, in a positive and safe learning environment [4, 5, 8]. Life drawing, clay modelling and other art-based approaches are also educationally beneficial due to their engagement, memorability and context outside of the dissecting room. All of these approaches make excellent tools for outreach and public engagement.

Body painting is fun, very enjoyable and often a challenge. You do not need to be a good artist, just to be able to follow instructions. Also body painting allows you to realize the situation of organs in the body, often for myself I find it surprising their exact locations and actual size. –A medical student at Durham University, UK

## References

1. Op Den Akker JW, Bohnen A, Oudegeest WJ, Hillen B. Giving color to a new curriculum: bodypaint as a tool in medical education. *Clin Anat.* 2002;15:356–62.
2. Eisendrath D. A text-book of clinical anatomy. 1st ed. Philadelphia: W.B. Saunders; 1904.
3. McMennamin PG. Body painting as a tool in clinical anatomy teaching. *Anat Sci Educ.* 2008;1(4):139–44.
4. Finn G, McLachlan J. A qualitative study of student responses to body painting. *Anat Sci Educ.* 2010;3(1):33–8.
5. Finn G. Twelve tips for running a successful body painting teaching session. *Med Teach.* 2010;32:887.
6. McLachlan JC, Patten D. Anatomy teaching: ghosts of the past, present and future. *Med Educ.* 2006;40:243–53.
7. Skidmore JR. The case for prosection: comment on R.L.M. Newell's paper. *Clin Anat.* 1995;8:128–30.
8. Finn G, White P, Abdelbagi I. The impact of color and role on retention of knowledge: a body-painting study within undergraduate medicine. *Anat Sci Educ.* 2011;4(6):311–7.
9. Cookson NE, Aka JJ, Finn GM. An exploration of anatomists' views toward the use of body painting in anatomical and medical education: an international study. *Anat Sci Educ.* 2018;11(2):146–54.
10. Aka JJ, Cookson NE, Hafferty F, Finn GM. Teaching by stealth: utilising the hidden curriculum through body painting within anatomy education. *Eur J Anat.* 2018;22(2):173–82.
11. Parker LM. Anatomical dissection: why are we cutting it out? Dissection in undergraduate teaching. *Aust N Z J Surg.* 2002;72:910–2.
12. McCormack WTP, Lazarus CMD, Stern DMDP, Small PAJMD. Peer nomination: a tool for identifying medical student exemplars in clinical competence and caring, evaluated at three medical schools. *Acad Med.* 2007;82(11):1033–9.



13. Granger NA. Dissection laboratory is vital to medical gross anatomy education. *Anat Rec B New Anat.* 2004;281B:6–8.
14. Pabst R. Gross anatomy: an outdated subject or an essential part of a modern medical curriculum? Results of a questionnaire circulated to final-year medical students. *Anat Rec.* 1993;237:431–3.
15. Aggarwal R, Brough H, Ellis H. Medical student participation in surface anatomy classes. *Clin Anat.* 2006;19:627–31.
16. Jariyapong P, Punsawad C, Bunratsami S, Kongthong P. Body painting to promote self-active learning of hand anatomy for preclinical medical students. *Med Educ Online.* 2016;21(1):30833.
17. Finn GM. Current perspectives on the role of body painting in medical education. *Adv Med Educ Pract.* 2018;9:701–6.
18. Estai M, Bunt S. Best teaching practices in anatomy education: a critical review. *Ann Anat.* 2016;208:151–7.
19. Finn GM, Bazira PJ, Bateman J, Sanders KA. Ultraviolet body painting: a new tool in the spectrum of anatomy education. *Eur J Anat.* 2018;22(6):521–7.
20. Biggs J. Aligning teaching and assessment to curriculum objectives: imaginative curriculum project. LTSN Generic Centre; 2003.
21. Biggs J. Enhancing teaching through constructive alignment. *High Educ.* 1996;32:347–264.