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'CAN YOU BE A DOCTOR, EVEN IF YOU FAINT?' THE TACIT LESSONS OF CADAVERIC DISSECTION

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SUMMARY

Background: *The undergraduate Medicine course at the University of Cambridge has included cadaveric dissection as part of its anatomy teaching for over three centuries. In recent years, medical schools in the UK and the US have debated whether cadaveric dissection is a useful and efficient way of teaching anatomy. Existing research on this subject has focused narrowly on the knowledge-acquisition for medical students afforded through dissection, and thus we have broadened the scope of such considerations to include the emotional responses of medical students to the dissection process.*

Subjects and methods: *The basis for this paper is a phenomenological analysis of response data gathered from 56 first year medical students at the University of Cambridge through written questionnaires and discussion groups before and after their first experiences of cadaveric dissection.*

Results: *Our research suggests that there are in fact many more lessons taught and acquired through studying in the dissection room: they are tacit, emotional, experiential and dispositional.*

Conclusions: *When this wider picture of the value of dissection is considered, a much stronger case for the continued inclusion of cadaveric dissection in the medical curriculum can be made, as it is a valuable and unique educational experience.*

Key words: *anatomy - medical education - cadaveric dissection - student perspectives - emotional response – professionalism - focus groups*

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INTRODUCTION

The undergraduate Medicine course at the University of Cambridge has included cadaveric dissection as part of its Anatomy teaching for over three centuries. In recent years, medical schools have debated whether cadaveric dissection is a useful and efficient way of teaching anatomy. Previous studies have largely focused on the knowledge-acquisition offered through dissection, reasoning that 'knowledge of internal cadaveric anatomy is crucial to a full understanding' of medicine (Day& Ahn 2010).

When the views of medical students are taken into consideration, the prominence of dissection becomes even more striking. They value cadaveric dissection as a 'favourable approach for achieving important learning objectives in anatomy' (Chapman et al. 2013) and a key way to enable future doctors 'to master the language of medical science so they can communicate with patients' (Singh et al. 2015).

Discussion of wider lessons beyond the learning of anatomy have focused on the 'behaviours of professionalism' taught, evaluated and promoted through cadaveric dissection' (Escobar-Poni & Poni 2006). The educational value of dissection has been recognised as pertaining to 'more than just anatomy', with discussion of the parallel development of 'professional and ethical skills training' (Rehkämper, 2016; Meguid & Khalil, 2016) and the potential for anatomical teaching to mimic the 'ethical aspects of daily work 'in a hospital (Singh et al, 2015). The importance of anatomy in 'medical professionalism and socialisation', including the emphasis on effective teamwork (Meguid & Khalil, 2016; Sbayeh et al, 2016). There is a need to extend the debate concerning the utility of dissection to consider its utility for pre-clinical medical students to acquire the skills of the medical profession.

In addition to the academic and professional benefits of cadaveric dissection, some have addressed the difficulties that many students experience during cadaveric dissection (Pabst et al, 2016). Studies suggest that a majority of medical students admit to 'negative psychological effects' relating to cadaveric dissection, including the development of professional strategies for 'coping with death and dying' (Day & Ahn 2010; Weyers et al. 2016). The literature suggests other emotional challenges with references to dissection room demonstrators who 'guide students through the course without emotional hardship', and the efforts of medical schools to hold commemoration services which seek to acknowledge the 'spiritual aspects' of dissection (Pabst et al, 2016). It has been suggested that the variety and complexity of the tacit emotional and professional lessons acquired in the dissection room remain 'relatively under explored' (Chapman & Hakeem 2015).

We investigated these issues through analysis of first year medical students' comments during focus group discussions of cadaveric dissection at the University of Cambridge.

METHOD

First year medial students at the University of Cambridge were invited to participate in optional discussion groups, two weeks into their first term, by which time they had undertaken four sessions of full body dissection. Fifty six of an intake of 280 students participated in facilitated group discussions during which they were invited to comment on four areas concerning their experience of dissection (knowledge acquisition, obstacles to learning, teamwork, manual technique) and four areas concerning their personal reactions (thoughts about death, the body's personhood, emotional and visceral responses to the cadaver). Additional data was available in the form of field notes taken by facilitators during group discussions and transcribed audio recordings of participants' reflections on the value of those discussions.

An inductive thematic analysis of these datasets was undertaken to describe the students' attitudes and responses. Quotations were uploaded into a Microsoft Excel spreadsheet and assigned to categories that were identified as recurring major themes. Further discussion within the research team led to refinement of these themes.

RESULTS

Seven major themes were identified: first day nerves; privilege, irreverence and desensitization; bodily responses; rehearsal for real life professionalism; fear of making mistakes; the kind of learning dissection offers; thoughts about death. A representative sample of quotations is presented in Table 1.

The majority of students admitted to having first day nerves on anticipating the first session, characterized by fear of the unknown regarding the cadaver and environment. Students described their feelings before entering the dissection room for the first time; some were simply 'uneasy for the whole morning before', while others said they were 'so, so nervous', 'very nervous', or even 'scared'.

Students tended to qualify such statements with a degree of practicality, and a resigned professional attitude. Comments included that 'we've got to see a dead body at some stage', and 'I thought that, well, you have to be tough to do medicine'. This effort to balance emotional unease with pragmatics, while clearly enabling for some students, for others might well have contributed to additional pressure to cope. For instance, one student saw the first day as 'something you have to get over', as if it were a test of their ability to continue with medicine's career trajectory. Indeed, discussion group data revealed a sense of 'stigma about not being OK' with dissection. One student felt others would ask 'why are you doing medicine if you're nervous of dissection?'

Participants often thought of their nerves as transitory and necessarily quickly overcome, as 'once you know you can do it you're ok to carry on with the course', and 'once you start it's fine'. One student described feeling 'more relaxed after the first time', and revealed a sense of pride in this ability to 'get over the shock' so that dissection 'becomes routine'. A student said explicitly that 'I knew I would feel strong if I didn't cry' upon seeing the cadaver for the first time. Reinforcing this idea of an informal test of sorts, another reflected 'I did better than I expected; surprised myself with how well I coped', even though it was widely felt that at this early stage of the medical curriculum 'we haven't been trained to cope with death yet'. The experience of 'imposter syndrome' was present in these early sessions in the dissection room, with some students saying that they 'didn't know enough to dissect a body' even though no prior knowledge was expected. Others found their first experience of dissection 'overwhelming', and were worried that this might suggest they did not have the right disposition for medicine. One simply asked, 'can you be a doctor, even if you faint on the first day of dissection?'

Some students were surprised by their physical reactions to first seeing the bodies. As one student noted, 'I thought I'd be ok but my hands were shaking'. Other students had similar feelings, admitting that 'if you fainted the first time you'd be scared you couldn't do medicine'. This pressure not to show physical signs of emotion or psychological unease led one student to write 'proud I didn't faint'. The 'pressure to be OK with dead bodies' felt by many students was expressed tangentially, such as in the aside that 'some people felt faint because the eyes were open on some cadavers', or that it was 'weird that they're completely naked'. This anxiety seems to have a gendered aspect: one student said that 'there's pressure amongst the boys not to be the one who faints'.

For a large number of students, the smell of the dissection room prompted physical aversion, both in their anticipation of the experience and the first time they experienced the DR. Again, this bodily reaction was described by many as a hurdle to be overcome. One student said quite plainly that 'I'm worried about the smell and seepage from the abdomen', and others echoed with similar sentiments that 'there was just such a pungent smell'.

Particular stages of dissection prompted challenging thoughts and responses for the students. The idea that 'cutting the surface of the body is emotionally difficult', in contrast to dissecting the internal organs which some students found easier because they could objectify them and see the parts as if in an anatomical model. Many students had particular concerns about specific stages, such as cutting the groin, which they felt would be 'really strange', prompting worry that maybe they 'should not be working on their private parts.' Several students with cadavers who had died from cancer were anxious that it would be 'distressing' to see tumours or malignancies *in situ*, particularly because they 'don't know what it'll look like'.

Table 1. Sample of quotations

Themes	Example Quotes
First Day Nerves	'the first day is something you have to get over'; 'it's scary but once you start it's fine'; 'I was more relaxed after the first time'; 'once you know you can do it you're ok to carry on'; 'my biggest fear was that my cadaver would be young'; 'I was scared'; 'I knew it was going to be a fellow human'; 'initially, it was really, really weird'; 'initially I just wanted to look at the cadaver and not start dissection straight away'; 'we've got to see a dead body at some stage'; 'at first it was a shock but then it becomes routine'; 'I knew I would feel strong if I didn't cry but expected others to cry so I tried to detach myself'; "I thought that, well, you have to be tough'; 'I was uneasy the whole morning before'; 'I was so so nervous'; 'I didn't know enough to dissect a body. I felt like an imposter'; 'I did better than I expected, surprised myself with how well I coped'; 'I was terrified I'd be dissecting my friend's recently deceased mum who had donated her body for dissection'; 'we haven't been trained to cope with death yet'; danger of too much preparation which could make students "actually more worried about things", "don't want to big things up too much"; "Very nervous. Now OK" – "stigma" of not being OK ; "why are you doing medicine if you feel nervous?"
Irreverence & Desensitisation	"I often have to remind myself how fortunate that we have the opportunity to be able to learn from dissection"; "I had to detach myself, I'm usually an emotional person"; "thrust into the deep end, happened very quickly - have to adapt"; "halfway in-between a human and an inanimate object"; "Mine died at 67. I'm sad he never got to enjoy his retirement"; "significant human elements" of the body "makes certain actions like cutting into the body a difficult task emotionally"; "what makes a person is gone - just a human, scientific once dead"; "maybe should not be working on their private parts"; "the hand will be difficult... there is something about people's hands that is quite personal"; "I forget he used to be a person"; "It doesn't look like a body"; "You become a bit detached"; "a really good model of a human made of plastic"; "I think of them as something from which I will learn anatomy, I don't think about the life they led etc." "excellent tool"; "try and maintain human connection"; "not just dead... they are very dead" - old and embalmed; "a young body may remind us that death is not far away"; "some people stand at the head so that they just look at the feet"; "good to look at the TV before cadaver - bit more remote"; "It is - they were - still are - a human being"; "all the bodies are old - content they have lived long lives. Now helping us. This is what they would have wanted"; I don't think dissection has had a massive impact on me, but perhaps it's one of those things that creep up on you with time; The "respect issue"; "But this is what they wanted" "as respectful as possible" ; "It is not only the patient who has decided to donate their body, it is their family as well - the respect these people must have for medicine and the importance they give to the teaching of future doctors"; "I feel we have a personal connection and respect towards her - I was really sad when we found a possible self harm scar on her arm"; "I would like to remember it is a real person, very grateful"; "my donor" and "our body"; "they are my teacher"; "But medical history sheet reminds you it's a person";

Table 1. Continues

Themes	Example Quotes
Irreverence & Desensitisation	same as when a doctor - show empathy but not become emotionally attached"; "completely separate thing…a body not a live patient. We are not "interacting" with them."; "At times you catch yourself doing things and telling yourself you shouldn't be doing them, like leaning on the face of the person"; The cadaver is half way between a human and a body; I think of it as a model and not really as a human.
Students' bodily responses and fears about some parts of the body	'Can you be a doctor, even if you faint?'; 'if you fainted the first time you'd be scared you couldn't do it'; 'I wasn't expecting to open the whole body'; 'I did better than I expected, I almost surprised myself how well I coped' 'I felt like covering the face, but wouldn't that be disrespectful?'; 'It's difficult when there's a lot of fat on the body'; 'the groin will be really strange'; "I'm worried about the wrists, they're really creepy'; 'Distressing to see cancers…don't know what it'll look like'; 'there's something about a hand that is quite personal'; 'I'm worried about the smell and seepage from the abdomen'; 'The head, brain and skull are the most human parts'; 'it feels so weird that they're completely naked'; 'There's pressure to be ok with dead bodies'; 'I try not to look at the face much, it reminds me he's human'; 'it's overwhelming'; 'usually I'm squeamish but I'm proud I didn't faint'; 'there's pressure amongst the boys not to be the one who faints'; 'it's strange looking at their face – it makes them an individual'; 'there was just such a pungent smell'; 'some people felt faint because the eyes were open on some cadavers'; 'I thought I would be ok but my hands were shaking'; 'cutting the surface of the body is emotionally difficult but once it's inside its ok, more of a teaching tool than a person then'; 'the cadaver is half way between a human and a body'; 'I think of it as a model and not really as a human'; 'mine had self harm scars, this was even more upsetting than a physical disease'
Rehearsal for future professionalism	There is little dissection 'etiquette'; But will dissection prepare us for seeing dead bodies as a doctor?; "doctors should be able to deal with it"; "pressure to be ok with dead bodies - doctors should be ok, would be 'awkward' not to be"; "that's what you signed up for"; You have to "get over it", "you've got to keep going"; If you put too many rules, you will be detracting from the value of what you are doing; Help each other out academically, logistically, and emotionally"; "Helpful, nice to know that we are all as clueless as each other. Our group is very cohesive and we share knowledge; Really good - my dissection group is lovely, we all take turns to do stuff, and we are all as clumsy as each other." "I've really enjoyed learning as a team, it's reassuring to be with others that also aren't 100% sure. Each person can take what they want out of it." Someone is always on the scalpel first; We'd try to tell her [team member] to have a go and she would say "oh no, I'm really bad at this" but we want her to have a go; If I want to be a surgeon, get used to technique, get used to how it feels, how to hold instruments properly. Useful to start this work early"; At the end of the session - "You just get on the bike, get a cereal bar" and off you go.
Fear of making mistakes	'fear of screwing up'; 'scared of cutting a vein'; 'I'm scared of being too rough or making the wrong cut'; 'there's no repercussions if you're harsh with the body, I worry it isn't teaching us to be gentle with patients'; 'I was scared of messing up and didn't want to waste any part of the body we were supposed to learn from'; 'need to get involved because the donation was a gift but I'm scared of messing up'

Table 1. Continues

Themes	Example Quotes
What kind of learning?	"slows down the information flow and attaches a physical aspect. Stimulates more senses"; Dissection "is helping me to see muscles, arteries, veins, etc. which helps me to understand where things are and what they do."; "physically flexing the forearm of the cadaver and getting to see the relevant muscles contract helps understanding"; "very helpful, it's really useful to see all the structures we're learning about on a real body"; "aware that each body is different"; "everything looks so different than in life, completely missed some scars, what does cancer look like?"; "helpful to touch and feel to remember anatomy; "3D awareness structures how we relate to each other"; "what veins, art, muscles etc. actually look like"; "Real life, not bright blue for veins and red for arteries"; "Feel for actual position of muscles, nerves etc. 3D"; "visual: seeing the location of the internal structures"; "lifting muscles up to see deep structures; In the end, will be working with people and not with a book when in practice as a doctor.
Thoughts about Death	Not really changed my attitude to death (common theme); It hasn't affected my thoughts about death; I don't think I want to donate my body in the same way; Consciousness makes a person. Body is just matter now consciousness gone. Just a model; A young body may remind us that death is not far away.

Indeed, the degree of 'difficulty' in dissecting any organ tended to be proportional to the 'personhood' expressed in the body part, as if there is a hierarchy of body parts, some being more personal than others. There was a range of attitudes about which body parts particularly moved students. In one discussion group, one student commented that their cadaver had 'self harm scars' on one wrist, which they found 'more upsetting than a physical disease'. This prompted conversation about the hands and wrists in general, with another saying that 'I'm worried about the wrists,they're really creepy', and 'there's something about a hand that is quite personal'. The head, brain and skull of the cadaver were considered 'the most human parts' by the majority of students. One participant said that 'it's strange looking at [the cadaver's] face – it makes them an individual', while another reported that 'I try not to look at the face much, it reminds me he's human'. Several students 'felt like covering the face' but refrained because they wondered 'wouldn't that be disrespectful?'

Tensions can be seen here between emotional responses from the students and the requirement to learn anatomy in order to progress through the medical course. Many tried to temper their emotions by thinking of their cadaver like 'a model and not really as a human', or 'half way between a human and a body'. This may demonstrate early professional detachment which students felt would enable them to view donors 'more [as] a teaching tool than a person'. When one group of students was asked if they felt 'more comfortable or desensitized' as time went by in the DR, the consensus was that they felt increasingly desensitized to the body. Many admitted that the physicality of the cadaver did not look real: they are "not just dead... they are very dead" as a result of the embalming process. One student voiced an opinion shared by others that "what makes a person is gone", while the cadaver becomes "scientific once dead". As a result, a minority said that unlike treating patients, there are "no repercussions if you're rough with the body", particularly when "we don't stick to the dissection manual". Others agreed that "I think of them as something from which I will learn anatomy, I don't think about the life they led", rather the body is an "excellent tool". For other students this detachment was more of an effort, and they willed themselves to think that the body was just "a really good model of a human made of plastic". Some developed strategies such as standing "at the head so that they just look at the feet" of the cadaver.

Students expressed the pragmatic argument that it was necessary to become at least partly emotionally distanced in order to focus on learning anatomy. Those who found it easier to detach also suggested that the limited amount of personal information they had about the cadaver when alive prevented humanizing them now. They were specimens rather than humans, "halfway in-between a human and an inanimate object". Others felt better able to vary their levels of detachment, depending on the context and point in the session. Certain students chose to remember the body's personhood at particular moments, to "try and maintain human connection". There were tender and protective descriptions of the bodies as "my donor" and "our body", "they are my teacher", to the extent that "we have a personal connection and respect towards her". A variety of viewpoints were shared about whether this attachment was helpful. Some saw timely desensitization as an inevitable process in becoming a doctor, and that they would be called on to show empathy but not become emotionally attached when qualified."I had to detach myself, I'm usually an emotional person", one student wrote.

This predicament of detachment was described by one student as 'the respect issue.' Many students voiced anxiety about whether there is a right or wrong way to feel towards the cadaver. This translated into concerns about what constituted appropriate behavior in the DR,

particularly as there 'is little dissection 'etiquette'' one student commented. 'At times you catch yourself doing things and telling yourself you shouldn't be doing them,' said an individual, 'like leaning on the face of the person.' Such comments suggest how the students developed their own individual sense of what it means to 'respect' a body. Some felt that respect means to treat the body as an object rather than infer details about their personal life, while others wanted to see the cadaver in a lived context. "It is not only the patient who has decided to donate their body, it is their family as well", so "the respect these people must have for medicine and the importance they give to the teaching of future doctors" requires behavior with an appropriate reverence.

Many students imaginatively engaged with the idea of "what the donor would have wanted" and what their intentions might have been in deciding to donate their body to science. "All the bodies are old", one student noted who was "content they have lived long lives. Now helping us. This is what they would have wanted." If someone donates their body, would they want students to be 'thinking of them as a person', one group considered. For many, granting personhood was a mark of respect, such as when one respondent wrote that 'I would like to remember it is a real person, very grateful.' Despite this desire to see the cadaver as a person, many students expressed hesitation about the often-cited notion of dissection cadavers being the students' 'first patient'.

There was broad consensus about the professional value of working as a team. Many expressed disappointment that there was no debrief from the demonstrators before leaving the dissection room, "You just get on the bike, get a cereal bar" and go to lectures. In place of a formal debrief, peers in colleges described how they discuss their experiences, taking strength from knowing that others were just about coping too. It was "nice to know that we are all as clueless as each other" one student wrote, "Our group is very cohesive and we share knowledge." This reflected a communal spirit in the DR that the majority of tables "help each other out academically, logistically, and emotionally". Another student said, 'I've really enjoyed learning as a team, it's reassuring to be with others that also aren't 100% sure. Each person can take what they want out of it.' Those who said they 'don't feel my table's a team' seemed regretful about this. Morale can make the experience "more light-hearted" particularly if people are struggling.

Within the table groups, team roles were already emerging. Certain individuals wanted to lead the team, which made some others feel he sitant as they 'Don't want to appear rude. Don't want to disappoint the team.' 'Someone is always on the scalpel first,' one student remarked. Aspiring surgeons who saw dissection as a 'useful (way) to start this work early', were criticized for viewing the dissection room as an opportunity to 'get used to technique, get used to how it feels, how to hold instruments properly.' But the table in question had found a way to handle this dominant personality, by rotating roles and announcing 'right, everyone move one place'. Despite 'dominant characters' on the table, overall there was a feeling that 'we complement each other'. A further pressure came from the perceived importance of not making mistakes while dissecting. Students explained how they were 'scared of messing up', afraid of 'being too rough, and making the wrong cut', or 'scared of cutting a vein'. There was a sense of not wanting to waste any part of the donated body 'we were supposed to learn from'. Some individuals would avoid dissecting if they thought they were 'really bad at this', while others noted that 'there's no repercussions if you're harsh with the body'. This freedom came with additional concerns, however, as other students said that they 'worry (dissection) isn't teaching us to be gentle with patients'.

Given this array of responses from the students, the question remains about what dissection really contributes to learning anatomy. Many students noted the difference between the cadaver and the anatomical diagrams they see in textbooks, and that the DR contributed a sense of 'real life', 'not bright blue for veins and red for arteries.' The chance to 'see all the structures we're learning about on a real body' was considered particularly useful because 'in the end, [we] will be working with people and not with a book when in practice as a doctor.' The bodies are poised between something real and something unfamiliar, as students also remarked that 'everything looks so different than in life.' There was widespread appreciation of the tactile presence of the body: one student described how it was 'helpful to touch and feel to remember anatomy' which 'added a significance to the things I'm learning.' By touching while seeing, students learned that 'each body is different' which means that you have to 'feel for actual position of muscles, nerves.' Some found it satisfying to move the body, 'physically flexing the forearm of the cadaver and getting to see the relevant muscles contract' which 'helps understanding' as well as 'lifting muscles up to see deep structures.' One student suggested that the tempo of learning is different because dissection 'slows down the information flow and attaches a physical aspect…stimulates more senses'.

CONCLUSION

In summary, our data points strongly to students having a rich, rewarding and varied experience of cadaveric dissection. Learning anatomy in this way encouraged them to confront their nerves and to feel the discomfort of their own bodily responses to the cadaver. These visceral reactions prompted students to consider how they viewed this body; as a person, an object, or as someone now dead whose wishes required continued respect. Many students commented that teamwork in the dissection room might be preparing them for the kinds of teams within which they will work as junior doctors, and to imagine their own roles as highlighted in previous literature (Singh et al, 2015; Escobar-Poni & Poni, 2006). A reluctance to make mistakes and the negotiation between admitting doubt in one's ability and the courage to learn-through-doing was also part of the learning curve of becoming more comfortable in the dissection room. After just two weeks, students were

able to cite learning outcomes that went beyond a strictly anatomical education. Indeed, students pointed towards lessons that were emotional, professional, and philosophical.

As a method for learning facts, dissection is, as one student commented, 'interesting, but potentially inefficient.' If dissection's place in curricula is defended purely on the rate of empirical information assimilation, its case for remaining relevant to future medical education is weak, given the plethora of excellent textbooks, computer simulations and electronic models which can assist anatomical learning. However, this is a narrow construction of anatomical education. Earlier literature highlighted the professional and ethical lessons delivered through cadaveric dissection; it has been further suggested that students may benefit from the confrontation with death early in their medical careers.

Our data supports the notion of professional development through cadaveric dissection, yet suggests that students did not find the experience of dissection particularly affected their ideas about death and dying. 'It hasn't affected my thoughts about death,' one student said bluntly and many agreed that their feelings had 'not really' changed. One student said that 'I don't think I want to donate my body in the same way.'

As such, our study demonstrates the broad benefits of dissection are much wider than the narrow scope of the two traditional tenets of dissection's educational value; knowledge acquisition and confrontation with death. We call for a wider appreciation of the tacit, emotional lessons in the dissection room. Both Gamlin and Womersley completed the Cambridge anatomy course as part of their medical training in 2015, and as such are keen advocates of the importance of reflection and discussion of the wider lessons from dissection.To have a meaningful debate about the value of dissection in modern medical curricula it is crucial to consider the benefits and challenges students experience in this aspect of their learning. It has been rewarding to find that the many medical students at Cambridge University valued the opportunity that the discussion groups offered to have a frank conversation about their thoughts and feelings concerning dissection.

Addressing the emotional experiences of students in the dissection room has the power to enable valuable revisions to anatomy courses to be made for future students. Medical schools have a responsibility to provide tomorrow's doctors with courses designed to make dissection a positive rather than unsettling learning experience. Without integrated discussion groups, student concerns about their ability to become a doctor (even if they fainted in dissection) might have remained private and disconcerting. By fostering a place for this kind of openness medical schools send the powerful message to their students that emotional and philosophical considerations are valuable and welcomed features of medical practice.

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