Accepted: 28 June 2017

DOI: 10.1111/eje.12285

ORIGINAL ARTICLE

WILEY

Sign language in dental education—A new nexus

T. Jones[1] | **K. Cumberbatch**[2]

[1]Dentistry Programme, Faculty of Medical Sciences, The University of the West Indies, Mona Campus, Kingston, Jamaica, W.I.

[2]Department of Language, Linguistics and Philosophy, Faculty of Humanities and Education, and Deaf Clinic Coordinator, Faculty of Medical Sciences, The University of the West Indies, Mona Campus, Kingston, Jamaica, W.I.

Correspondence
Thaon Jones, Dentistry Programme, Faculty of Medical Sciences, The University of the West Indies, Mona Campus, Kingston, Jamaica, W.I.
Email: thaon.jones@uwimona.edu.jm

Abstract

Focus: The introduction of the landmark mandatory teaching of sign language to undergraduate dental students at the University of the West Indies (UWI), Mona Campus in Kingston, Jamaica, to bridge the communication gap between dentists and their patients is reviewed.

Literature review: A review of over 90 Doctor of Dental Surgery and Doctor of Dental Medicine curricula in North America, the United Kingdom, parts of Europe and Australia showed no inclusion of sign language in those curricula as a mandatory component.

History of sign language in dental education: In Jamaica, the government's training school for dental auxiliaries served as the forerunner to the UWI's introduction of formal training of sign language in 2012. Outside of the UWI, a couple of dental schools have sign language courses, but none have a mandatory programme as the one at the UWI.

Programme rationale: Dentists the world over have had to rely on interpreters to sign with their deaf patients. The deaf in Jamaica have not appreciated the fact that dentists cannot sign and they have felt insulted and only go to the dentist in emergency situations. The mandatory inclusion of sign language in the Undergraduate Dental Programme curriculum at The University of the West Indies, Mona Campus, sought to establish a direct communication channel to formally bridge this gap.

Programme development: The programme of two sign language courses and a direct clinical competency requirement was developed during the second year of the first cohort of the newly introduced undergraduate dental programme through a collaborating partnership between two faculties on the Mona Campus.

Implementation: The programme was introduced in 2012 in the third year of the 5-year undergraduate dental programme.

Programme review & outcomes: To date, two cohorts have completed the programme, and the preliminary findings from an ongoing clinical study have shown a positive impact on dental care access and dental treatment for deaf patients at the UWI Mona Dental Polyclinic.

Implications: The development of a direct communication channel between dental students and the deaf that has led to increased dental access and treatment for the deaf can be extended to dentists and to other dental students globally. The vision is that similar courses will be introduced in other health training programmes at the UWI, and conceivably, in other institutions.

Limitations: The small sample size allows for informative, but not definitive, conclusions to be drawn.

Conclusion: The mandatory inclusion of sign language and Deaf culture in the dental curricula has not just removed a communication barrier, but has assisted in the empathetic and ethical development of the dental student.

KEYWORDS

competency, curriculum, dental education, dentistry in Jamaica, sign language, UWI Mona

1 | FOCUS

Dentists, in general, cannot sign, and they normally rely on a third party to interpret. These persons, unless they are trained interpreters, are usually not competent in a sign language and/or lack interpreting skills. Consequently, they often mislead the dentist. The deaf*[1] are acutely aware of the communication barrier between themselves and their dentists, and due to this barrier, they are reluctant to make dental appointments.[2,3] The UWI Mona in Kingston, Jamaica, has introduced a mandatory sign language component in its UDP to reduce the miscommunication between dentists and deaf patients, and lead to improved dental care outcomes for deaf patients. The genesis, development, implementation and evaluation of the sign language curricula are reviewed here, now that the first three cohorts have completed the sign language courses, and the first cohort has graduated after completing their clinical training inclusive of deaf patient requirements.

2 | LITERATURE REVIEW

A review of 102 journals via SFX Ex Libris revealed no articles on mandatory sign language clinical competency programmes in dental schools in North America, parts of Europe and Australia. Online examination of 97 dentistry programmes was also conducted. The websites of 66 dental schools in the United States of America (USA), 10 in Canada, 18 in the United Kingdom and three in Australia were reviewed including downloadable documents on their programme offerings. The dental school lists for North America were verified as complete by the websites of the American Student Dental Association[4] and of the American Dental Education Association.[5] The list for British schools was verified by the websites of the General Dental Council,[6] the Dental Schools Council[7] and the British Dental Association.[8] The website of the Australian Dental Students Association was the source for the list of dental schools in Australia.[9] See Figure 1 below.

Two programmes in the United Kingdom[10,11] and one in the United States introduce sign language to pharmacy students, but not to their dental students.[12] Based on the review of dental programmes, the UWI Mona programme is the first such programme in the world of its kind in health education that targets dental students and, by extension, is the first such mandatory programme for dental students in the world. The review of the literature that supported this was somewhat of a revelation as the hypothesis was that this course, in one form or the other, was already included in the curricula of other dental schools.

Sign language competency makes for a better dentist,[13] and through the learning of sign language, dentists would also develop empathy and a level of professional care that they most likely would have not developed without doing a sign language course. This is corroborated in a report[14] which points out the recognition that there have been several calls for building sign language into dental curricula and that this would be beneficial. Further, the US government acknowledged that Americans with disabilities are more likely to receive substandard care and identified fallacious assumptions about the disabled that contribute to this lower level of care.[15]

The review identified one student who had studied a sign language in his undergraduate years who asked in an online forum whether this would help him get into dental school.[16] The response was that yes, it would help his application, as it would show diversity which always is a positive for a prospective dental student.[16] Similarly, having sign language competency upon graduation would be an asset as it would attract deaf patients to a dentist who could speak their language. This is the aspect that the UWI Mona programme focuses on. Due to the Disabilities Act in the USA, interpreters in the dental office[17,18] are as far as dental offices have gone in defining sign language in dentistry. In the review of the literature, it is evident that dentists have met this minimum legal requirement.

3 | HISTORY OF SIGN LANGUAGE IN DENTAL EDUCATION

3.1 | In Jamaica

In 2000, the Ministry of Health implemented a mandatory Jamaican Sign Language (JSL) course for all Dental Auxiliaries at its training school that was developed in conjunction with the Jamaica Association for the Deaf (JAD). The course focused on the development of vocabulary and conversation skills. Students who successfully completed the course developed clinical competency in signing with deaf patients from Special Needs Schools. Initially, the accompanying schoolteacher served as an interpreter for the patients but as the signing competency of the student Dental Auxiliaries increased, the

*Following the convention in Deaf studies, deaf denotes having a hearing loss while Deaf refers to being a member of a cultural community whose primary means of communication is visual gestural.

FIGURE 1 World map showing dental schools surveyed in the study

teacher/interpreter intervention was decreased. In 2011, this training school was closed. This course was the template on which the creation of the sign language programme at the UWI Mona was built.

3.2 | Internationally

The *Introduction to Deafness* course at the Case Western Reserve University School of Dentistry in the USA is the closest such course to the one at the UWI Mona as it sensitises dental students to Deaf culture and communication methods, but does not try to achieve sign language competency.[14] This course was designed in the early 1980s, but no record of its being offered was found and it is not listed in its present curriculum. At that university, high school applicants can participate in a Bachelor's to DMD programme. They must master a "critical language" before commencing the DMD phase of the programme. American Sign Language (ASL) is listed as desirable. Therefore, whilst sign language competence is seen as an asset to the prospective dentist, the dental curriculum itself does not include any sign language courses.

At Midwestern University College of Dental Medicine, USA, PPRAD 1318 *Introduction to ASL for Health Professionals* is a professional elective course in the Chicago College of Pharmacy.[12] It carries one credit, covers culture and syntax and focuses on vocabulary and conversation skills in the medical domain. There is no indication of PPRA1318 being included in the DMD programme. Loma Linda University of Dentistry in California has no sign language course in dentistry. However, two dental hygiene students did research projects on oral health care in ASL. They won dental hygiene research awards from the California Dental Association and Alumni Student Convention. Again, the work on incorporating sign language into dentistry is valued but not extrapolated into competency development in sign language in dental education.

In the UK, British Sign Language (BSL) is present in some form in a few health programmes. The University of Aberdeen School of Medicine and Dentistry, Scotland, offers the Level 3 course ME33SL/ME43CB *Communicating in British Sign Language*.[10] Students can do the course as a part of their third-year Medical Humanities Student Selected Component (SSC). It is unclear from the course title how much of the course is focused on the medical domain. A search of the university website and documents yielded no further information. Queen's University Belfast also has a sign language SSC in its medical programme but it is unclear whether dental students take this course.[19] At King's College London, three sign language courses are offered. BSL levels 1 and 2 are highly recommended for healthcare students. MUS3243 *Deaf Awareness and British Sign Language* is a well-subscribed SSC taken by Phase 3 students.[11] Student research on BSL was found at the University of Birmingham where students created a one-page BSL e-course for a Paediatric Dentistry Student Selected Module project.[20] The page includes a 1:08 minute video with key sign language phrases. The University of Birmingham School of Dentistry itself has no sign language courses.

4 | PROGRAMME RATIONALE

Studies[14,21] have shown that the communication barrier between deaf patients and their dentists is problematic and deaf patients feel more comfortable when their dentists can communicate with them directly in sign language. In 2011, the Jamaican Deaf population stood at 74 857 of a national census determined population of 2 474 670. This is above the global ratio of one deaf per person per 1000 members of the population. This has been due to two spikes in the deaf population: one due to a meningitis outbreak in the 1980s and the other to a rubella outbreak in the 1950s. According to the World Health

Organization, there are 59 million deaf, and 360 million persons with hearing loss, in the world.[13,22] The global experience is that there is no known direct correlation between deafness and oral health. Empirical evidence on the Jamaican situation supported a study where approximately two-thirds of the respondents encountered communication difficulties during a dental appointment,[2] and because of the communication barrier, there is a growing group of dental patients who are deaf who do not visit the dentist unless for emergency treatment. The marginalisation of these patients was the impetus for the conceptualisation and development of the mandatory inclusion of sign language in the UWI Mona dental curriculum with the goal being that direct communication is best for effective communication between the dentist and the deaf.

In Jamaica, no legal statutes exist for the use of interpreters in dental practice, but in the United States, the Disabilities Act of 1990 legalised the use of interpreters in the dental office.[18] By this Act, dentists are legally obligated to employ interpreters.[18,23] Several problems are associated with relying on sign language interpreters to communicate with patients.[23] One such problem is loss of information when interpreting is performed by untrained persons, like parents and teachers, whose only skill is language competence. Another problem is a lack of sensitivity to the heterogeneity in culture and language use within the Deaf community. In Jamaica, whilst the government acknowledges the need for sign language interpreters in government agencies, including health facilities, JSL is as yet not officially recognised as the language of the Deaf community in Jamaica. Therefore, the government is not yet obligated to allocate monetary and other resources towards the provision of sign language interpreters. Without this provision, the need for dental practitioners who are themselves competent in sign language is greater.

The rationale for the UWI Mona course development was to improve the direct communication channels between the deaf and dentists by removing the need for hiring interpreters locally by initially having dental students learn to sign directly with deaf patients, and then have dental practitioners learn to communicate directly with the deaf. This rationale is derived from one of the UDP's philosophical goals[24] of the development of the empathetic dentist and is aligned to two attributes of the distinctive UWI graduate, viz. an effective communicator with good interpersonal skills, and a socially, culturally and environmentally responsible person. The competent student dentist would also satisfy the outreach mandate of the university for its students.

5 | PROGRAMME DEVELOPMENT

The UWI Mona Faculty of Medical Sciences (FMS) sign language course in its UDP is the first such course for dental education in Jamaica and was patterned off the ministry's template. The programme seeks to develop sign language competence in student dentists. This is the unique feature of the UWI Mona DDS programme. In 2010, the UWI Mona introduced their UDP, simultaneously with a new programme at the University of Technology, Jamaica. This followed the lead of their sister campus in St. Augustine, Trinidad, who started a UDP in 1989. Sign language was not included in the UWI Mona's first curriculum. The curriculum was revised in 2011, and sign language was included.

The inclusion sought to address problems described by deaf patients that are related to a lack of sensitivity to Deaf culture as well as a lack of knowledge of sign language on the part of the healthcare practitioner, generally.[15] Champion and Holt[2] suggested that masks be removed whilst talking with the patient and that dentist should acquire basic signs. The sign language component of the UWI Mona UDP sees to these two recommendations.

Discussions then ensued with the JAD, based on the prior knowledge of their involvement in the Ministry of Health's programme, about how to implement a sign language course. As the talks developed, the JAD informed the FMS that the Department of Language, Linguistics and Philosophy (DLLP) in the Faculty of Humanities and Education (FHE) at UWI Mona had a sign language programme and that it would be more economical for the FMS to develop the course with DLLP as there would be significant costs associated with the JAD's participation.

A meeting between FMS and DLLP led to the development of a two-part programme-Pre-Clinical, that is academic, and Clinical. The first consists of a 1-year, two-course programme, and the second consists of the clinical treatment of deaf patients in the UMDP. In the first course, LING1819 *Beginners Caribbean Sign Language*, students gain basic signing competence and an understanding of basic grammatical constructs. LING1819 assessment is focused on their learning the manual alphabet used in the Caribbean as well as their ability to introduce and describe themselves, discuss everyday tasks and routines, and understand the same type of information being relayed to them. In the second course, LING2821 *Sign Language for Medicine and Dentistry*, key aspects of Deaf culture and discipline-specific[†] [25] signing at an intermediate level are covered. Students also learn lexicalised fingerspelling for communicating dental terminology, complex grammar and communicating with a patient on all aspects of history-taking and management. The procedure areas covered in dental care include examinations, intraoral and extraoral; cleanings/prophylaxis; restorations, composite, amalgam; crowns and bridges; dentures; orthodontic appliances; extractions; oral hygiene instructions; endodontic therapy; and local anaesthesia.

LING2821 assessment measures their knowledge of Deaf culture and grammar, and patient care (via objective structured clinical examinations). In LING2821, students are instructed to always remove their mask when signing as facial grammar is critical to comprehension. It is recommended that they sign with deaf patients before the patient reclines in the chair and the dentist moves to sit behind the patient. By so doing, the dentist can take a history, describe procedures and have important discussions with the patient before commencing treatment. This was mentioned as a wish of deaf patients.[2,18]

LING2821 includes a module on Deaf culture as deaf patients had described problems related to a lack of knowledge of sign language and Deaf culture on the part of the healthcare practitioner.[15,18] Videos

[†]The students are streamed for tutorials. Dentistry students learn signs particular to the dental setting and students in the other medical fields are placed in other streams.

were prepared as instructional material for LING2821 with Deaf actors and practising dentists simulating or describing various dental procedures. These JSL videos are shown to deaf patients attending the polyclinic as deaf patients also expressed the usefulness of videos explaining the procedures. LING2821 arms students with a body of knowledge of the Deaf community from which they can draw to arrive at well-informed conclusions about their deaf patients.

Both LING1819 and LING2821 are only assessed through coursework. The assessments consist of theoretical and performance-based tasks. For example, LING1819 tests measure the ability of the student to apply the basic grammatical structures in their production of sentences in sign language. In LING2821, the final coursework assessment involves the students being assessed by two examiners whilst they introduce themselves to a patient, escort the patient to a dental chair and then treat a patient based on a pre-written procedure that they select from a table with different procedures written on pieces of paper. Whereas LING1819 was an existing course in the FHE, LING2821 is a totally new course that was developed for the FMS. Each course has fifty-two (52) contact hours over 13 weeks. Students are deemed to have performed poorly in the courses if they achieve a mark below 50%. These students have to repeat the course at its next offering. There is no limit to the number of times that the student can take the courses. These students can only receive 50% as their maximum grade when they eventually pass the course. The courses are taught in the Dental Sciences Phase after the Basic Sciences Phase and are concluded directly before the Clinical Phase of the UDP.

The Clinical Phase is directly linked to the Pre-Clinical, that is academic, Phase so the students can immediately utilise their language skills when caring for deaf patients in the polyclinic and develop clinical competency in the use of sign language. In the Clinical Phase, the students are assessed on their treatment of deaf patients for 4-6 h each month in two sessions and they have to complete the treatment of 80 patients as one of their clinical requirements. This assessment investigates the perspective of the student dentist and the deaf patient on the effectiveness of direct communication using sign language in dental care. A research study examining the correlation between quality of patient care and treatment outcomes at the UMDP and the signing competence of student dentists has received ethics approval and is being conducted.

6 | IMPLEMENTATION

The programme was implemented in the 2012/2013 academic year after having successfully been supported and approved at the level of the faculty's and university's academic approval mechanism. The initial programme targeted dental students with the view that over time all the students in the different FMS programmes would enrol in similar discipline-specific courses. Nursing students also enrolled in the first offering. In 2013/2014, the second programme comprised students from the dental, medical, nursing and physiotherapy programmes, and in 2014/2015, the third cohort of students included students from all programmes, as the School of Medical Radiation Technology students enrolled. The courses are compulsory for the dental students, but remain optional for the other students in the faculty.

7 | PROGRAMME REVIEW AND OUTCOMES

The first cohort of thirteen (13) dental students completed the sign language component in May 2013. All passed the introductory sign language course in 2012 with grades ranging from 47% to 92%, a mean value of 69% and a median value of 73% (Table 1).

In Sign Language for Medicine and Dentistry, again all were successful, but three (3) students were barred from sitting the final examination due to registration issues. The grades ranged from 47% to 83%, with a mean value of 69% and a median value of 69% (Table 2).

In comparing the three cohorts in both courses, the second cohort of dental students had the highest median scores, followed by the first cohort and then by the third cohort. The inference is that the second cohort performed best on the assessment procedures. The means

TABLE 1 LING1819 Beginners Caribbean Sign Language

Cohort	No. of students	Pass rate (%)	Lowest grade (%)	Highest grade (%)	Grades differential	Mean (%)	Median (%)
Class of 2015	13	100	47	92	45	69	73
Class of 2016	17	100	59	97	38	85	87
Class of 2017	12	100	48	89	41	69	69

TABLE 2 LING2821 Sign Language for Medicine and Dentistry

Cohort	No. of students	Pass rate (%)	Lowest grade (%)	Highest grade (%)	Grades differential	Mean (%)	Median (%)
Class of 2015	13	100	47	83	36	69	69
Class of 2016	17	94	42	79	37	68	72
Class of 2017	11[a]	100[a]	55	75	20	65	65

[a]One student did not register.

did not follow the same pattern. The second cohort had the highest mean in LING1819, whilst the first cohort had the highest mean in LING2821.

The overall pass rate range (94%-100%) indicates that the students should perform competently in the clinical treatment of deaf patients, and that direct communication with the deaf patients should result in better treatment delivery and outcomes as their success in the course indicates that they are now able to use sign language to introduce themselves to the patient, direct the patient to the UMDP, take a medical and dental history, obtain informed consent, express and explain dental procedures and give post-operative instructions, whilst at all times respecting and understanding Deaf culture, and interacting with the deaf in culturally appropriate ways.

To date, a total of 66 patients have been seen by 38 students in 194 visits. On average, each student saw two patients, each patient visited the clinic three times (range 1-13), and each student saw a patient five times (range 1-13). There were a total of 194 visits for a total of 582 h (1 visit=3 contact h) with an average of nine contact h being the time spent by each patient with each student. The preliminary results from the clinical treatment of deaf patients in the ongoing study on *The Correlation between Quality of Healthcare for deaf Patients and Sign Language Competence among Student Dentists* have shown that the deaf patients are supportive of the direct communication channels opened between them and the student dentists and that this direct channel has led to improved treatment outcomes (Table 3).[3] 100% of the deaf patients responded that is important for dentists to sign with their patients and 75% of the student dentist responded that direct signed communication with their deaf patients is their preferred communication method. Eighty-one percent of the deaf patients responded that a dentist had never signed with them before, and 94% responded that they would want their dentist to sign with them every time they visit. Seventy-eight percent felt that a dentist who signs directly with them would treat them better than a dentist who signed and used an interpreter. 62.5% of the student dentists responded definitively that their knowledge of Deaf culture and language improved the delivery of their dental treatment.

8 | IMPLICATIONS

The positive effectiveness of direct communication using sign language in dental care and the correlation of the acquisition of sign language competence and improved dental care of deaf patients are the major implication of the study. This will serve to guide the further development of the courses, and how these courses can be implemented in other dental programmes, and by extension in health education and training programmes across the world. The addition of sign language to dental curricula will aid the development of the ethical and professional student dentist as the students' treatment of the deaf and their understanding of Deaf culture will develop greater empathy.

For dentists and dental health teams to continue to be competent in this skill, they are encouraged to include deaf patients as a part of their patient pool in their dental offices. A continuing education course is being developed for dentists and members of their dental team. Developing continuing education workshops and courses for non-signing dentists currently in private practice is another implication. These courses/workshops will begin to reverse the present study[3] that show that deaf patients resist attending the dental office of a dentist who cannot sign. Deaf patients have stated that they are not as comfortable with non-signing dentists as they would be with those that can sign.[1,17] At the time of writing, 1.82% (4/220) licensed dentists in Jamaica are competent signers.[25]

Another implication that follows on the training of dentists in the private sector is that their dental operatories will need to be remodelled/re-organised to support the treatment of deaf patients. At the UMDP, the dental operatories/cubicles are close to the ideal 11 foot by 11 foot international standard so that the student dentist, the supervising dentist and the Deaf Clinic Coordinator can be comfortably seated in the cubicle during the treatment and assessment procedures.

9 | LIMITATIONS

The Clinical Phase of the programme has seen one cohort complete the programme, whilst the second cohort is in the assessment phase of their treatment of deaf patients. Thus, the conclusions drawn from this small sample size are informative, but not definitive. The present paper describes the programme at a point in which there is only one cohort of graduates, so longitudinal information is unavailable on if proper oral health care maintained by deaf patients is because of effective communication between them and their signing dentists.

10 | CONCLUSION

The inclusion of sign language and Deaf culture in dental curricula exposes the dental student to a social subculture which leads to a graduate who sees the deaf patient not just as belonging to a category of special needs but to a cultural and linguistic minority that will no longer be underserved due to a communication barrier. The awareness of and appreciation for another culture affirms and expands their individual perspective leading to a more grounded character, and a more ethical and empathetic dentist. Signing proficiency provides an opportunity to care for and be relevant to an underserved population by the development of effective communication skills coupled with good interpersonal skills based on the understandings derived from the knowledge gained in the courses on the social, cultural and environmental norms of the deaf.

The growing field of medical humanities needs to become ingrained in health curricula worldwide. Clinical sign language competence should be a mandatory learning outcome in all health programmes as it will enable healthcare providers to be more inclusive in delivering treatment to their patients. This is the goal of healthcare.

TABLE 3 Preliminary results from ongoing study on the correlation between quality of healthcare for deaf patients and sign language competence amongst student dentists

Participant	Selected questionnaire item and responses
Student dentist (n=33)	Qn 3. Have you ever treated deaf patients before? Yes 0% No 100%
	Qn 11. Before learning to sign, what did you think was the relevance of sign language competence to your dental practice? Very irrelevant 15.625% Irrelevant 21.875% Of little relevance 40.625% Relevant 15.625% Very relevant 6.25
	Qn 13. Before actually having deaf patients, what did you think was the relevance of sign language competence to your dental practice? Very irrelevant 6.25% Irrelevant 28.125% Of little relevance 43.75% Relevant 15.625% Very relevant 6.25
	Qn 14. Which of the following communication methods do you prefer for interaction with your patient? Use a parent or legal guardian 6.25 Direct signed communication with patient 75.0% Use an interpreter 12.5% Other-sign directly with interpreter if needed 3.125% No response 3.125%
	Qn 20. Did your knowledge of Deaf language and culture improve the service you provided to your deaf patient today? No 0% Unsure 6.25 Somewhat 28.125 Definitively 62.5 No response 3.125%
Deaf Patient (n=37)	Qn 21. Do you think it is important for dentists to sign with their patients? Yes 100.0% No 0.0%
	Qn 9. Has a dentist ever signed with you before? Yes 2.7% No 81.0% No response 2.7%
	Qn 22. Would you want your dentist to sign with you every time you go to the dentist? Yes 94.59% No 5.41%
	Qn 23. Who do you feel can take care of you better? A dentist who signs without an interpreter 78.38% A dentist who signs and uses an interpreter 21.62%

CONFLICT OF INTEREST

In accordance with the guidelines of the *European Journal of Dental Education* and our ethical obligations as researchers, the authors hereby certify that they have no affiliations with or involvement in any organisation or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership or other equity interest; and expert testimony or patent-licensing arrangements) or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

REFERENCES

1. Cumberbatch K. *Caribbean Sign Language for Dentistry: A Guide to Communicating with Deaf Patients for Dental Practitioners*. Tacarigua: HIS Publishing; 2014.
2. Champion J, Holt R. Dental care for children and young people who have a hearing impairment. *Br Dent J*. 2000;189:155-159.
3. Cumberbatch K, Jones T, Alexis-Garsee C. *The Correlation Between Quality of Healthcare for Deaf Patients and Sign Language Competence Among Student Dentists*. Mona: The University of the West Indies; 2015.
4. U.S. Dental Schools. American Student Dental Association, 2015. http://www.asdanet.org/us-dental-schools.aspx.

5. U.S. and Canadian Dental Schools. American Dental Education Association, 2015. http://www.adea.org/dental_education_pathways/aadsas/Pages/PDS.aspx.
6. Dentistry programmes and qualifications. General Dental Council, 2015. https://www.gdc-uk.org/Dentalprofessionals/Education/Pages/Dentist-qualifications.aspx.
7. Dental Schools Council. Dental Schools Council. http://www.dentalschoolscouncil.ac.uk/members.htm.
8. Dental Schools School contact details. British Dental Association, 2016. https://www.bda.org/students/careers-education/dental-schools/school-contact-details.
9. adsa | Schools. Australian Dental Students Association, 2014. http://www.adsa.org.au/schools.
10. MB ChB Medical Humanities Student Selected Component (SSC). University of Aberdeen, 2008. http://www.abdn.ac.uk/cad/documents/BPF_Posters_2008/Medical_Humanities.pdf.
11. King's College London. *Deaf Awareness and British Sign Language*, 2015. http://www.kcl.ac.uk/health/study/facilities/chantler/teaching/clinicalcom/dabsl.aspx.
12. Elective Course Descriptions. Midwestern University. https://www.midwestern.edu/course_catalog_home/downers_grove_il_campus/chicago_college_of_pharmacy/elective_course_descriptions.html.
13. Deafness and hearing loss. World Health Organisation, 2014. http://www.who.int/mediacentre/factsheets/fs300/en/.
14. Clark CA, Cangelosi-Williams P, Lee MA, Morgan L. Dental treatment for deaf patients. *Spec Care Dentist*. 1986;6:102-108.
15. Iezzoni LI. Going beyond disease to address disability. *N Engl J Med*. 2006;355:976-979.
16. Sign Language. Student Doctor Network, 2009. forums.studentdoctor.net/threads/sign-language.594763/
17. DiPietro LJ, Knight CH, Sams JS. Health care delivery for deaf patients: the provider's role. *Am Ann Deaf*. 1981;126:106-112.
18. Barnett S. Communication with deaf and hard-of-hearing people: a guide for medical education. *Acad Med*. 2002;77:694-700.
19. Centre for Medical Education Summer Studentship Project Summaries 2016. Queen's University Belfast. http://www.med.qub.ac.uk/CMEstudentships/ProjectSummaries2016.pdf.
20. Paediatric Dentistry: British Sign Language. University of Birmingham. http://www.mecourse.com/ecourse/pages/page.asp?pid=2828.
21. Huether KJ, Born DO. Dentistry for hearing impaired persons. *Northwest Dent*. 1982;61:14-17.
22. Questions and Answers for Health Care Providers. Silver Spring, MD: National Association of the Deaf. http://www.nad.org/issues/health-care/providers/questions-and-answers.
23. Sfikas PM. Serving the hearing impaired: an update on the use of sign-language interpreters for dental patients and their families. *J Am Dent Assoc*. 2001;132:681-683.
24. Revised Proposal for the Introduction of the Undergraduate Doctor of Dental Surgery (DDS) Degree Programme at the Mona Campus. Appendix 1: Philosophy, Goals and Aims. Kingston: Faculty of Medical Sciences, University of the West Indies; 2012:46-50.
25. dental-council | Dentists. Dental Council of Jamaica, 2016. http://www.dentalcouncilofjamaica.com/registered-dentists.

How to cite this article: Jones T, Cumberbatch K. Sign language in dental education—A new nexus. *Eur J Dent Educ*. 2018;22:143–150. https://doi.org/10.1111/eje.12285