European Journal of Pediatrics (2019) 178:929–935
https://doi.org/10.1007/s00431-019-03369-w

ORIGINAL ARTICLE

Parental internet search in the field of pediatric orthopedics

Christian-Dominik Peterlein[1] · Maren Bosch[1] · Nina Timmesfeld[2] · Susanne Fuchs-Winkelmann[1]

Received: 10 December 2018 / Revised: 18 March 2019 / Accepted: 20 March 2019 / Published online: 10 April 2019

Abstract

Parents whose children are affected by systemic diseases, anomalies, deformities, or further orthopedic defective positions use the Internet to increase their knowledge. However, there have been few studies that focus, as this one does, on Internet enquiries done before the parents contact the pediatric orthopedic surgeon. This study analyzed data gathered through a standardized questionnaire on general habits of Internet use, parents' hardware, age, and educational background of the parents. A total of 521 questionnaires were completed for a response rate of 96%. One-quarter of parents ($n = 127$) attended the consultation because of a gait anomaly or foot deformity, followed by children with DDH (20%, $n = 99$), clubfoot (9%, $n = 47$), and scoliosis (6%, $n = 29$). Parents of children with clubfoot were especially likely to look for health information online (84%, $n = 38$), followed by parents of children with scoliosis (69%, $n = 20$), with DDH (67%, $n = 66$), and with foot deformity/gait anomaly (49%, $n = 62$). Most people (97%, $n = 295$) using the Internet for health research purposes made use of a search engine. Concerning use of social media, respondents with clubfoot children were the most numerous (38%, $n = 18$). There were 35 parents who intended to discuss the results of their Internet research with the pediatric orthopedic surgeon. Most (84%, $n = 254$) of the respondents who used the Internet for health research planned to do so again.

Conclusion: This study documented that the Internet is an important and popular source of information for parents or caregivers in the field of pediatric orthopedics.

Level of evidence: Level II; prospective study

What is known:
•*Parents and caregivers often search the Internet for information, particularly before an upcoming operation in the field of orthopedic disorders.*

What is new:
•*This study provides recent data on parental Internet research in a large study population.*

Keywords Internet · Study · Pediatric orthopedics · Social media · Clubfoot · Scoliosis · DDH · Cerebral palsy

Introduction

The use of the Internet and social media channels as a source of health information has risen steadily [9, 12, 18]. In particular, parents and caregivers search the Internet for information about their children's diseases or to review experiences with physicians online before visiting a specialist [2, 14, 15, 19, 23, 28]. This study evaluated parental use of the Internet to gather information on the individual disorders, anomalies, or systemic diseases of their children. Previous studies have reported on the prevalence of Internet and social media use for orthopedic patients [4–7, 11, 27]. A study in 2009 revealed that half of the respondents used the Internet for health research before consultation with the specialized physician, and that 82% ($n = 233$) of the study population had access to a computer with the Internet [25]. We hypothesized that increasing access would further increase the use of the Internet and social media for health information. Therefore, this study was designed in the style of the abovementioned study to detect new developments and trends. Studies that allow a chronological follow-up of Internet research are not really available.

Communicated by Mario Bianchetti

✉ Christian-Dominik Peterlein
peterlei@med.uni-marburg.de

[1] Center for Orthopaedics and Trauma Surgery, University Hospital Giessen and Marburg, Baldingerstraße, 35041 Marburg, Germany

[2] Institute of Medical Biometry and Epidemiology, Philipps-University of Marburg, Marburg, Germany

The question arises of how parents or caregivers approach anomalies and deformities in the field of pediatric orthopedics or systemic diseases of their children [29]. What role do search engines, medical portals, or specific disease-related websites play in parents' searches? How do they evaluate the information obtained? Which pediatric orthopedic diseases are researched particularly intensively on the Internet?

Likewise, the impact of the information obtained online on the doctor-patient relationship and possibly the associated adaptation of the therapy requires an evaluation. The aim of this study was to evaluate the parents' Internet and social media use regarding health information before attending a pediatric orthopedic consultation.

Material and methods

The study was conducted in accordance with the principles specified by the Declaration of Helsinki. Prior to the investigations, an approval was secured by the local board of ethics on September 8, 2017 (AZ 107/17).

Between September 2017 and April 2018, 540 parents or caregivers attended a consultation with their child at our Pediatric Orthopaedic Department; they were asked to complete a questionnaire while sitting in the waiting room. A covering letter explained the intention of the study and its voluntary participation. Before participating, the respondents had to confirm and sign an informed consent form. Any parents who had already answered the survey previously, who did not confirm the agreement, or who had insufficient language skills to understand the questions were excluded.

The study was developed based on a questionnaire used by Tuffrey and Finlay [32]. The questionnaire comprised 21 multiple-choice questions as well as yes or no questions. Suggestive and stereotype formulations were avoided [16]. The survey started with questions concerning age, gender, graduation, access to the Internet, and characteristics of the parents' Internet use in general. Further, parents had to indicate the reason for their consultation. They could choose between "clubfoot," "scoliosis," "developmental dysplasia hip (DDH)," "cerebral palsy," and "foot deformity/gait anomaly." Parents were then asked about their sources of health information. If they ticked "Internet," they were asked to answer further questions on search engines, medical forums, specific pediatric orthopedic forums, and social media platforms. We selected "Google," "Yahoo," "Ask.com," and "Bing" as search engines, as suggested by Wang et al. [33]. If parents used social media, they were asked about their exchanges with other social media users. Furthermore, the study cohort was asked about quality of the information on the Internet and the usefulness of the homepage of our department.

Finally, parents or caregivers were asked about their intentions to discuss the information found on the Internet with the physician. They were also asked if they would use the Internet again to find health information. To identify the sources, they preferred to gain more information about the clinical picture of their children, they could select among telephone, e-mail, WhatsApp, and social media, since these were the most mentioned sources in the survey by Duymus et al. [7].

The statistical evaluation of the pseudonymous data was carried out independently. The indicated relative frequencies herein refer to all persons who have answered the corresponding question, unless otherwise noted. The Fisher-Freeman-Halton test was used to verify the relationship between two nominal or ordinal features, with the level of significance set at 5%.

Results

Of the 540 questionnaires we administered, 521 questionnaires were completed, corresponding to a response rate of 96%. Two questionnaires were excluded because of the abovementioned criteria, leaving 519 surveys to evaluate.

More than three-quarters (77%) of the participants ($n = 509$) were mothers; 21% ($n = 107$) were fathers; and 2% ($n = 12$) were other caregivers. The age of distribution showed that more than half the participants (62%) were over 35 years of age (Table 1). Half of all respondents ($n = 253$) had attained a high

Table 1 Characteristics of respondents

Variable	*n*	(%)
Role		
Mother	400	(77)
Father	107	(21)
Custodial	12	(2)
Age, y		
< 25	34	(7)
25–30	63	(12)
30–35	101	(19)
35–40	113	(22)
> 40	207	(40)
Education		
Elementary	76	(15)
High school	253	(50)
College/university	180	(35)
Disease of the child		
Cerebral palsy	2	(0)
Club foot	47	(9)
Gait anomaly/ deformity	127	(25)
Hip dysplasia	99	(20)
Scoliosis	29	(6)
Other	206	(40)

school education. One-quarter of the parents ($n = 127$) attended the consultation because of a gait anomaly or foot deformity; the other common reasons were DDH (20%, $n = 99$), clubfoot (9%, $n = 47$), and scoliosis (6%, $n = 29$). At the time of their study participation, for almost two-thirds ($n = 320$) of the participants, this was their first consultation at the time of this study; for 14% ($n = 75$), it was their second visit; and for 24% ($n = 122$), it was their third visit. There were just eight participants (2%) without Internet access at home. In addition, 87% of parents ($n = 450$) used a smartphone to get Internet access, 68% ($n = 354$) used a laptop, 55% ($n = 288$) used a tablet, and 45% ($n = 232$) used a computer. Nearly half of the parents ($n = 234$) used the Internet on a daily basis for an average of 1 to 3 h. Three respondents reported a daily Internet use of about 10 h. Out of the 74% ($n = 410$) of parents who researched their children's conditions, almost three-quarters of them ($n = 303$) accessed the Internet to do so, with an especially high percentage among parents with children with clubfoot. Out of the 46 parents who indicated that their consultations were for a child with clubfoot, 39 had searched online (Fig. 1).

Most (97%, $n = 295$) respondents who used the Internet for health or medical research made use of a search engine: 99% ($n = 291$) searched through Google, and 44% ($n = 129$) of them described their research as helpful, 32% ($n = 92$) rated it as partially helpful, and 1% ($n = 4$) rated it as not helpful. Almost 50% ($n = 143$) of the respondents who noted that they used the Internet for health information indicated that they used a health portal or medical database; 97 of the parents selected netdoktor.de, 34% ($n = 33$) considered it helpful, and 46% ($n = 45$) considered it partially helpful. Additionally, 33% ($n = 47$) used Onmeda and 40% ($n = 17$) considered it helpful; 22% ($n = 31$) used urbia; 15% ($n = 22$) used orthoforum.de; 10% ($n = 15$) used kindernetzwerke.de; and 8% ($n = 11$) used pubmed.de (Fig. 2). Only 68 respondents mentioned using special orthopedic forums, and nearly half of those ($n = 30$) used a website maintained by the German Association for Pediatric Orthopedics (kinderorthopädie.org), which 50% ($n = 15$) rated as helpful. There were 18 parents who used a website designed by parents for parents with clubfoot children (Klumpfusskinder.de), and 60% of them ($n = 11$) rated it as helpful. The portal Rehakids.org is created by parents and dedicated to parents with disabled children; that portal was named by 18% of the respondents ($n = 12$) who had used the Internet, and almost 60% ($n = 7$) rated it as helpful (Fig. 2).

Sixty-seven parents indicated that they used social media as a health resource. Respondents with clubfoot children mentioned social media most often (38%, $n = 18$), with ten of them, using it to exchange with other social media users; 60% of them ($n = 6$) evaluated it as helpful. Forty-three respondents checked collaborative projects (e.g., Wikipedia). Of the 67 respondents who used social media for health-related reasons, 25% had used social network sites like Facebook, Twitter, and MySpace. Half the respondents (50%, $n = 262$) checked the website maintained by the orthopedic department: 59% ($n = 155$) had looked for information about the attending pediatric orthopedic surgeon; 21% ($n = 55$) for information about the disease, which 38% considered helpful; and 20% ($n = 53$) checked different therapeutic options.

Of the 519 respondents, 146 reported that they searched less than 1 h online for information about the medical condition of their child before attending our consultation, whereas 69 indicated that they had spent between 1 and 2 h for information; 30 more than 3 h; and 12 more than 10 h. In summary, it can therefore be said that 50% of the parents searched the Internet before visiting our consultation. There were 35 parents who said that they intended to discuss their Internet search results with the pediatric orthopedic surgeon, and 84% of the respondents who used the Internet for health research ($n = 254$) would return to the Internet. Compared with

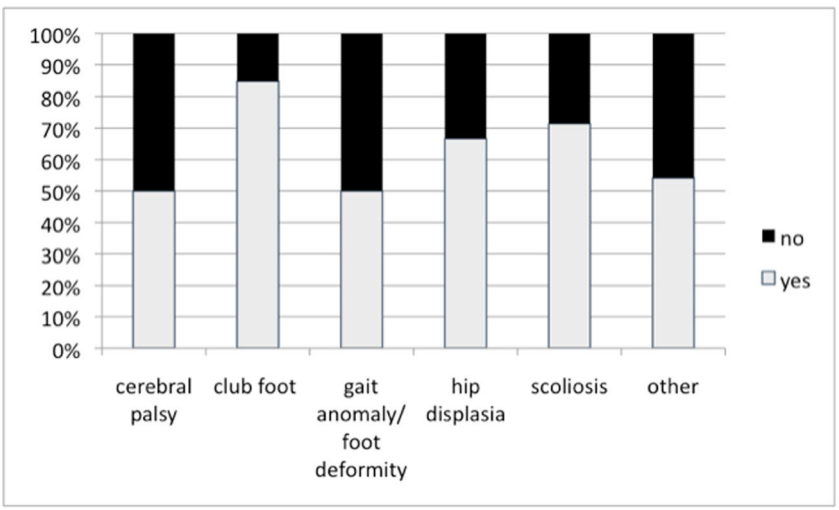

Fig. 1 Parental Internet research is above-average for club feet

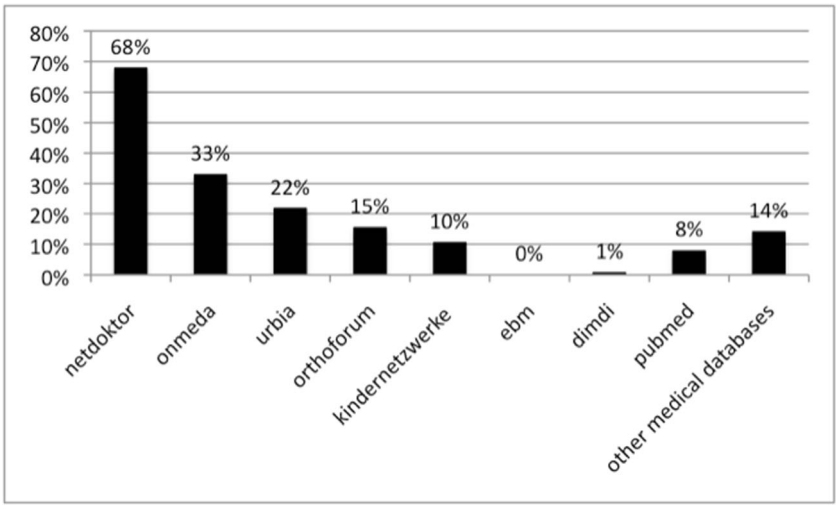

Fig. 2 Parental use of special homepages and medical databases

other possible sources to obtain medical information, the Internet demonstrated a leading position (Fig. 3).

Discussion

The Internet has revolutionized access to medical information [8–10]. In view of the rapidly growing range of health portals, special forums, search engines, and websites of clinics and medical practices, the question arises as to whether these sources of information are used by patients, caregivers, or related persons. This study was specifically designed to examine parental research and preparation for a pediatric orthopedic consultation at our university hospital.

To make it possible to classify the collected data with regard to informative value, we conducted a literature search using Medline and PubMed. When searching for data, we used the following keywords: "Internet" and "information," both together and in conjunction with "pediatric" and "orthopedic." Several studies were found (Table 2), although this study showed the largest number of participants so far. Overall, there has been a growing prevalence of Internet research over the years. Tuffrey and Finlay [32] reported a prevalence of 22% ($n = 107$) in 2002; Sim et al. reported a prevalence of 53% ($n = 144$) in 2007 [3]; and this study reported a prevalence of 74%. This is in part due to the continuously increasing number of Internet connections worldwide. However, a comparison with studies on general orthopedic questions [1, 7, 22] suggests a high prevalence of Internet research in the field of pediatric orthopedics.

Beall et al. noted in 2002 that parents or family members were most likely to seek information about complex, chronic conditions of their children on the Internet [24]. They found the highest parental Internet search rates were those related to scoliosis. Almost all respondents in this study recommended the Internet as a useful source of information, prompting the authors to call for the active collaboration of physicians in the design of patient-oriented, high-quality websites.

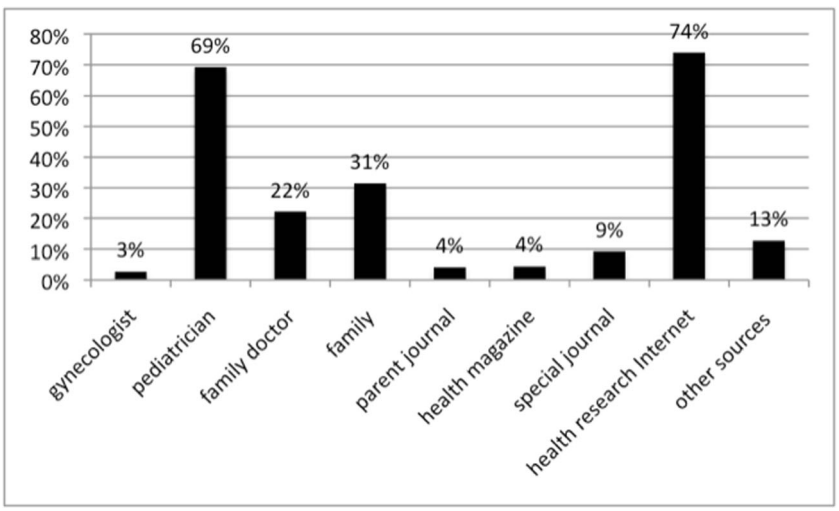

Fig. 3 Sources used by parents to obtain medical information

Table 2 Previous studies of parental Internet research in the field of pediatric orthopedics, in chronological order

Author, year	Place of study	Disease	Participants	Results
Taylor et al. (2001) [30]	Colorado, USA	Hereditary diseases	157	• 47% of parents had searched the Internet previously • 92% would search a physician-recommended website
Beall 3rd et al. (2002) [24]	Michigan, USA	Pediatric orthopedic diseases	228	• 40% had Internet access at home • 53% of parents searched Internet (scoliosis), 18% (fracture) • 75% were satisfied with Internet research • 50% wanted to discuss their results
Tuffrey & Finlay (2002) [32]	Bath, UK	Pediatric orthopedic diseases	485	• 51% had Internet access at home • 22% had searched the Internet • 84% found the Internet information useful • parents who knew their child's disease used the Internet more often
Aslam et al. (2005) [13]	Oxford, UK	Pediatric orthopedic diseases: focus club foot	177	• 84% had Internet access • quality of information is different • there is a need for evidence-based websites
Sim et al. (2007) [3]	London, UK	Pediatric surgical ambulance	271	• 93% had Internet access • 60% used the Internet daily • Google was the most popular search engine • 90% searched for diagnosis, 21% for single symptoms
Peterlein et al. (2009) [25]	Marburg, Germany	Pediatric orthopedics	288	• 82% had Internet access at home • 40% had used the Internet for health information • 60% found the Internet information helpful • 91% would use the Internet again for health information • 33% wanted to discuss the results found on the Internet
Baker et al. (2012) [2]	Dublin, Ireland	Scoliosis	168	• 96% had Internet access at home • 58% had used the Internet for information on scoliosis • 33% found their results confusing • 77% felt the information helpful found on the Internet
Hand et al. (2013)[14]	Dublin, Ireland	Pediatric orthopedics	214	• 91% with Internet access at home • 38% had used the Internet for information on their child's condition • 52% found the Internet information helpful • 43% had discussed or wanted to discuss the results they found online
Lysenko et al. (2016) [19]	Toronto, Canada	Scoliosis	71	• 96% of parents had searched for health information • 18% found the information very helpful

A lack of academically based websites was also reported by Aslam et al. [13], who specifically examined the quality of Internet information on clubfoot and found that 36% of the websites offered irrelevant, partly false information. The average information content was calculated as scoring only 26 points on a score of 0–100 points (maximum score 100). Morcuende et al. investigated the influence of the Internet on the treatment of clubfoot at their orthopedics department in Iowa [26], noting an exponential increase in treatment over an observation period from 1995 to 2002 that they attributed to the predominantly positive reporting of the "conservative" therapy regimen (e.g., redressing casts and subsequent splint treatment) practiced for decades in Iowa in Internet forums and websites of parents' self-help groups. This resulted in an increase of both the spontaneous appearance of parents with affected children and referrals of medical colleagues [26]. The therapy concept, according to Ponseti, later prevailed in countries around the world as a standard procedure in the treatment of congenital clubfoot [26]. The influence of the Internet on this development is obvious.

Compared to a previous investigation [25], there is widespread access to the Internet, with 98% ($n = 510$) of all respondents indicating that they had Internet access at home.

Again, the studies showed that parents of children with a clubfoot had used the Internet significantly more often ($p < .001$). Internet search engines find numerous online links under the keyword "clubfoot." Sim et al. also referred to Google as the most frequently used search engine by far [3]. They found that 90% used the exact diagnosis of the child as a keyword and 21% used the individual clinical symptoms. The authors examined the extent of parental Internet research in their pediatric surgical outpatient clinic.

This study had a focus on Internet and social media as a health-related source. One of the most-used health portals in

Germany is netdoktor.de. It is also presented in this study. Ninety-seven parents indicated netdoktor.de, and 80% considered it helpful and partially helpful but the quality of information is ordinary [34]. Forty-three respondents used a collaborative project like Wikipedia. Everyone on the Internet can edit articles on Wikipedia, so the quality of information is variable and changes often, but a study from Rajagopalan and colleagues comparing cancer information on Wikipedia with a professional database showed that the accuracy of both was similar. The content on Wikipedia can be less readable [21]. Seventeen parents indicated to use social network sites like Facebook, Twitter, and MySpace. Authors are often anonymous and the quality is limited [31]. YouTube was also named as a health-related source including physician and non-physician videos. Analyses of the quality of information about different orthopedic diseases have shown in to be mostly poor [17, 20].

In response to the increasing prevalence of health-related Internet pages, our hospital's own websites are updated almost daily. It presents the current therapies, surgical procedures, and follow-up regimens, including in pediatric orthopedics, and they can be accessed by patients. This study showed a frequent use of our own homepage, with every second participant mentioning it.

Nevertheless, a recently published survey on 987 members of the Pediatric Orthopaedic Society of North America (POSNA) detected regional differences concerning social media usage, and the authors concluded that most pediatric orthopedic surgeons were not taking full advantage of their potential social media presence [18].

Conclusion

The increasing influence of the Internet in everyday life and the rapid expansion of social media usage will affect the doctor-patient relationship. Pediatric orthopedic surgeons will increasingly be confronted with the results of parental Internet research in the future.

Authors' contributions Christian-Dominik Peterlein: conceptualization; writing initial draft. Maren Bosch: data curation; layout tables and figures. Nina Timmesfeld: statistical analysis. Susanne Fuchs-Winkelmann: conceptualization; project administration.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflicts of interest.

Ethical approval This article does not contain any studies on human participants or animals.

Informed consent Informed consent was obtained from all individual participants included in the study.

References

1. Aslam N, Bowyer D, Wainwright A, Theologis T, Benson M (2005) Evaluation of internet use by paediatric orthopaedic outpatients and the quality of information available. J Pediatr Orthop B 14(2):129–133
2. Baker J, Devitt B, Lynch S, C G, Byrne D, Kiely P (2012) Internet use by parents of children attending a dedicated scoliosis outpatient clinic. Eur Spine J 21(10):1972–1977
3. Beall MS 3rd, Golladay GJ, Greenfield ML, Hensinger RN, Biermann JS (2002) Use of the internet by pediatric orthopaedic outpatients. J Pediatr Orthop 22(2):261–264
4. Curry E, Li X, Nguyen J, Matzkin E (2014) Prevalence of internet and social media usage in orthopedic surgery. Orthop Rev (Pavia) 6(3):5483. https://doi.org/10.4081/or.2014.5483
5. De Martino I, D'Apolito R, McLawhorn AS, Fehring KA, Sculco PK, Gasparini G (2017) Social media for patients: benefits and drawbacks. Curr Rev Musculoskelet Med 10(1):141–145
6. Dekkers T, Melles M, Groeneveld BS, de Ridder H (2018) Web-based patient education in orthopedics: systematic review. J Med Internet Res 20(4):e143. https://doi.org/10.2196/jmir.9013
7. Duymus TM, Karadeniz H, Cacan MA, Komur B, Demirtas A, Zehir S, Azboy I (2017) Internet and social media usage of orthopaedic patients: a questionnaire-based survey. World J Orthop 8(2): 178–186. https://doi.org/10.5312/wjo.v8.i2.178
8. Eysenbach G (2008) Medicine 2.0: social networking, collaboration, participation, apomediation, and openness. J Med Internet Res 10(3):e22. https://doi.org/10.2196/jmir.1030
9. Eysenbach G, Kohler C (2003) What is the prevalence of health-related searches on the World Wide Web? Qualitative and quantitative analysis of search engine queries on the internet. In: AMIA Annual Symposium Proceedings. American Medical Informatics Association, p 225
10. Eysenbach G, Wyatt J (2002) Using the internet for surveys and health research. J Med Internet Res 4(2):E13. https://doi.org/10.2196/jmir.4.2.e13
11. Fraval A, Ming Chong Y, Holcdorf D, Plunkett V, Tran P (2012) Internet use by orthopaedic outpatients - current trends and practices. Australas Med J 5(12):633–638. https://doi.org/10.4066/amj.2012.1530
12. Grajales FJ 3rd, Sheps S, Ho K, Novak-Lauscher H, Eysenbach G (2014) Social media: a review and tutorial of applications in medicine and health care. J Med Internet Res 16(2):e13. https://doi.org/10.2196/jmir.2912
13. Gupte C, Hassan A, McDermott I, Thomas R (2002) The internet–friend or foe? A questionnaire study of orthopaedic out-patients. Ann R Coll Surg Engl 84(3):187–192
14. Hand F, Mc Dowell DT, Glynn R, Rowley H, Mortell A (2013) Patterns of internet use by parents of children attending a pediatric surgical service. Pediatr Surg Int 29(7):729–733
15. Harvey S, Memon A, Khan R, Yasin F (2017) Parent's use of the Internet in the search for healthcare information and subsequent impact on the doctor–patient relationship. Ir J Med Sci 1971:1–6
16. Kirchhoff S, Kuhnt S, Lipp PS Siegfried (2010): Der Fragebogen. Datenbasis Konstruktion und Auswertung. 5. Aufl Wiesbaden
17. Koller U, Waldstein W, Schatz KD, Windhager R (2016) YouTube provides irrelevant information for the diagnosis and treatment of hip arthritis. Int Orthop 40(10):1995–2002
18. Lander ST, Sanders JO, Cook PC, O'Malley NT (2017) Social media in pediatric orthopaedics. J Pediatr Orthop 37:e436–e439. https://doi.org/10.1097/bpo.0000000000001032
19. Lysenko M, Law P, Jarvis J, Wright JG (2016) Improving education and coping of scoliosis patients undergoing surgery, and their families, using e-health. J Child Orthop 10(6):673–683

20. MacLeod MG, Hoppe DJ, Simunovic N, Bhandari M, Philippon MJ, Ayeni OR (2015) YouTube as an information source for femoroacetabular impingement: a systematic review of video content. Arthroscopy 31(1):136–142
21. Moorhead SA, Hazlett DE, Harrison L, Carroll JK, Irwin A, Hoving C (2013) A new dimension of health care: systematic review of the uses, benefits, and limitations of social media for health communication. J Med Internet Res 15(4):e85
22. Morcuende JA, Egbert M, Ponseti IV (2003) The effect of the internet in the treatment of congenital idiopathic clubfoot. Iowa Orthop J 23:83
23. Pehora C, Gajaria N, Stoute M, Fracassa S, Serebale-O'Sullivan R, Matava CT (2015) Are parents getting it right? A survey of parents' Internet use for children's health care information. Interact J Med Res 4(2):e12. https://doi.org/10.2196/ijmr.3790
24. Pennekamp PH, Diedrich O, Schmitt O, Kraft CN (2006) Frequency and utility of internet use by orthopaedic patients. Z Orthop Grenzgeb 144(5):459–463. https://doi.org/10.1055/s-2006-942237
25. Peterlein CD, Schofer MD, Guntermann LC, Timmesfeld N, Fuchs-Winkelmann S, Schmitt J (2009) Parental enquiries before frequenting the outpatient paediatric orthopaedic consultation–focus Internet. Z Orthop Unfall 147(6):721–726. https://doi.org/10.1055/s-0029-1185898
26. Rajagopalan MS, Khanna VK, Leiter Y, Stott M, Showalter TN, Dicker AP, Lawrence YR (2011) Patient-oriented cancer information on the internet: a comparison of wikipedia and a professionally maintained database. J Oncol Pract 7(5):319–323
27. Rozental TD, George TM, Chacko AT (2010) Social networking among upper extremity patients. J Hand Surg [Am] 35(5):819–823.e811. https://doi.org/10.1016/j.jhsa.2009.12.043
28. Sebelefsky C, Voitl J, Karner D, Klein F, Voitl P, Bock A (2016) Internet use of parents before attending a general pediatric outpatient clinic: does it change their information level and assessment of acute diseases? BMC Pediatr 16:129. https://doi.org/10.1186/s12887-016-0677-8
29. Shuyler KS, Knight KM (2003) What are patients seeking when they turn to the internet? Qualitative content analysis of questions asked by visitors to an orthopaedics web site. J Med Internet Res 5(4)
30. Sim NZ, Kitteringham L, Spitz L, Pierro A, Kiely E, Drake D, Curry J (2007) Information on the World Wide Web—how useful is it for parents? J Pediatr Surg 42(2):305–312
31. Taylor MR, Alman A, Manchester DK (2001) Use of the internet by patients and their families to obtain genetics-related information. Mayo Clin Proc 76(8):772–776. https://doi.org/10.1016/S0025-6196(11)63219-9
32. Tuffrey C, Finlay F (2002) Use of the internet by parents of paediatric outpatients. Arch Dis Child 87(6):534–536
33. Wang L, Wang J, Wang M, Li Y, Liang Y, Xu D (2012) Using internet search engines to obtain medical information: a comparative study. J Med Internet Res 14(3):e74