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Vesna Boric

# Analiza citata radova objavljenih u časopisu Acta stomatologica Croatica zabilježenih u bazi podataka Web of Science

## *Citation Analysis of the Papers' Published in Acta Stomatologica Croatica using Web of Science Database*

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Središnja stomatološka knjižnica Stomatološkog fakulteta Sveučilišta u Zagrebu  
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### Sažetak

Bibliometrijska analiza časopisa Acta stomatologica Croatica (ASCRO) obavljena je za razdoblje od godine 1966. do 2006. **Svrha:** Istraživanjem se željelo utvrditi stupanj komunikabilnosti časopisa tj. utjecaj objavljenih radova na druge radove i znanstvenike. **Materijali i metode:** Na uzorku pribavljenom pretraživanjem baze podataka Web of Science (WoS) obavljena je citatna analiza, a podaci su obrađeni deskriptivnom statistikom. **Rezultati:** Pretraživanjem je izdvojeno 185 radova s ukupno 257 citata te je svaki od citiranih radova dobio prosječno 1,4 citata. Znamo li da su u časopisu objavljena ukupno 1.273 rada, svaki je citiran prosječno 0,2 puta. Analiza pogrešaka pokazala je da su kod 50,2% radova svi elementi bibliografskog opisa navedeni bez pogreške, a ukupno su zabilježene 163 pogreške u citiranju. Najviše se pogrešaka (65%) bilo je u naslovu časopisa. Najveći broj citata po radu jest pet. Najviše citata po godini je 28 i to 1991. Razdioba citata prema starosti rada pokazuje da je maksimum od 9,3% citata postignut u trećoj godini od objavljivanja rada, a zatim se njihov broj smanjuje. ASCRO je citiran u 65 časopisa, a najviše (44,7%) u Coll. Antropol. Ukupno je zabilježeno 60,7% samocitata, a 21% citata naveli su isključivo strani autori. **Zaključak:** Konačno je moguće istaknuti da ne bismo trebali biti zadovoljiti sadašnjom razinom utjecaja ASCRO-a na domaću i svjetsku znanstvenu zajednicu. Analiza pokazuje razmjerno skroman ukupan broj citata te velik broj samocitata i mali udjel citata stranih autora, što su pokazatelji slabe komunikacije stranih autora s radovima iz analiziranog časopisa. Kao opći zadatak mora se postaviti izvrsnost, a da se to postigne, treba ustrajno podizati razinu kvalitete svih segmenata u složenom procesu izdavanja znanstvenog časopisa, posebice vrsnoću objavljenih radova.

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### Ključne riječi

znanstveni časopisi; bibliometrija;  
analiza citata; samocitati

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### Uvod

Svrha je znanstvenog istraživanja otkriti djelić stvarnosti, produbiti postojeće spoznaje i ugraditi ih u mozaik ukupnoga ljudskog znanja. Za to postoje uobičajene metode, postupci i sredstva, a nezaobila-

### Introduction

The goal of the scientific research is to discover a small part of the reality, to deepen the existing knowledges and to implement them in the mosaic of the overall human knowledge. There are usual meth-

zni segment jest predati rezultate istraživanja znanstvenoj zajednici radi prosudbe. Najvažniji formalni komunikacijski kanal čine primarni znanstveni časopisi. Kako bi komunikacija bila uspostavljena, potrebno je osigurati dostupnost bibliografskih podataka o radu te organizirati sustav distribucije primarnih dokumenata, neovisno o tome radi li se o tiskanom ili elektroničkom mediju.

Sustavno prikupljanje podataka o tome postoje li neka istraživanja, obavljaju bibliografska informacijska središta, a zahvaljujući sekundarnim publikacijama informacije postaju dostupne svima zainteresiranima. Bibliografska središta godinama su pripremala i izdavala tiskane indeksne publikacije kao, na primjer, Current Contents, Index to Dental Literature, Index Medicus, Excerpta Medica, Science Citation Index, Social Science Citation Index, Arts & Humanities Science Citation Index i druge. Sve te publikacije transformirale su se u baze podataka. Digitalna izdanja registrirana su pod novim imenima, softverski opremljena pretraživačima i ponuđena korisnicima kao informacijski servisi. Tako se sada koristimo bazama podataka PubMed, Scopus, Web of Science (WoS) ili Web of Knowledge (WoK), a najpoznatija, opća sekundarna publikacija Current Contents, zadržala je ime. Sažet prikaz navedenog preustroja na primjeru ISI-ja (Institute for Scientific Information/Thomson Scientific) donosi Stojanovski (1).

Izdavači primarnih časopisa nastoje uključiti svoju publikaciju u što više sekundarnih baza podataka, jer se tako povećava „vidljivost“ časopisa. No, komercijalnim nakladnicima sekundarnih publikacija nije primarni cilj obuhvatiti što veći broj časopisa, nego im je dominantna ekonomska logika. Poznato je, naime, da većina baza podataka godinama indeksira podjednak broj naslova, iako produkcija časopisa u svijetu kontinuirano raste. To znači da su kriteriji za uključenje novih časopisa sve stroži, što pozitivno utječe na motiviranost pretenadata da stalno podižu kvalitetu časopisa. S druge strane, događa se da časopis zadovoljava sve deklarirane kriterije, a ipak od prosudbenog tijela izdavača dobije negativan odgovor s obrazloženjem koje otprilike glasi: područje x dobro je pokriveno u bazi y. To može obeshrabiliti uredništva malih znanstvenih zajednica ne-engleskoga govornog područja, budući da takvim časopisima ne daje gotovo nikakvu mogućnost za uključenje, bez obzira na njihovu kvalitetu. Poznato je da ISI-jeve baze podataka pokrivaju samo 5 do 7 posto svjetske produkcije časopisa. Tako je ono najnovije pokaza-

ods, procedures and the means for that, while the inevitable segment is presenting the results of the research before the scientific community for their judgement. The most important formal communication channel are the primary scientific journals. In order to set the communication, it is necessary to insure the availability of bibliographic data on paper as well as to organize the distribution system of the primary documents whether they are stored on printed or electronic media.

A systematic acquisition of the data on the existence of some researches are carried out by the bibliographic reference centres. The information are accessible to the interested parties via secondary publications. For a long period of time bibliographic centres have been creating and publishing printed index publications such as Current Contents, Index to Dental Literature, Index Medicus, Excerpta Medica, Science Citation Index, Social Science Citation Index, Arts & Humanities Science Citation Index etc. All the mentioned publications have transformed into the databases. The digital versions are registered under the new names, they have been equipped by the new browsers and offered to the users as reference centres. Hence we are now using PubMed, Scopus, Web of Science (WoS) or Web of Knowledge (WoK) database, while the largest general secondary publication Current Contents has kept its name. A brief review of the mentioned transformation of the ISI (Institute for Scientific Information/Thomson Scientific) is brought by Stojanovski. (1)

The publishers of the primary journals are trying to include their publication in as many secondary databases as possible to increase the “visibility“ of the journal. However, covering as many journals as possible is not the primary goal of the commercial publishers, but a dominant economic logic. It is known that most of the databases are indexing a relatively equal number of titles for a long number of years, even though the production of the journals worldwide is continually growing. That means that the criteria for the inclusion of new journals are becoming more strict. The good side of that is the motivation of the aspirant for constant improvement of the quality of the journal. On the other side, sometimes the journal meets all the criteria and still receives a negative reply by the publisher's evaluation board with an explanation such as: the x scientific field is covered well in the y database. That can discourage the editorial boards of smaller scientific communities of non-English-speaking countries since such journals are given almost no chance to be included regardless of their

lo da je 5,9% hrvatskih znanstvenih časopisa indeksirano u WoS-u (2). Potpuno je legitimno da vlasnik baze procjenjuje troškove i dobit, te donosi autonomne odluke. No, isto tako i uredništva procjenjuju globalne trendove u znanstvenom izdavaštvu i odabiru smjer razvoja svojih publikacija s obzirom na to kakve rezultate žele postići (3). Mnogi neprofitni izdavači prepoznali su mogućnosti nove tehnologije te pronalaze alternativne modele znanstvene komunikacije i povećanja dostupnosti svojih publikacija. Svjedoci smo snažnog širenja interneta kao globalne mreže. Elektroničko izdavaštvo doživljava uzlet početkom devedesetih godina, te su mnogobrojni časopisi, osim tiskane inačice, počeli objavljivati i digitalna izdanja. Ta dva čimbenika, ali i stalno povećanje pretplatničke cijene, vjerojatno su pridonijeli pokretu za otvoren pristup informacijama (SP – slobodan pristup) koji jača u drugoj polovici devedesetih godina (4). On se temelji na stajalištu da rezultati istraživanja financiranih iz javnih sredstava predstavljaju opće dobro i zato moraju biti javno dostupni. Ideja dobiva sve više pristaša, posebice među znanstvenicima i neprofitnim nakladnicima. Tako danas imamo u slobodnom pristupu javno dostupne mnogobrojne časopise - na internetskim stranicama izdavača ili u sklopu većih specijaliziranih direktorija/portala kao što su DOAJ, Hrčak i drugi. Mnogobrojni hrvatski časopisi počeli su izlaziti i u elektroničkom izdanju, pa tako i *Acta stomatologica Croatica* (Online) od godine 2006. Pritom je važno istaknuti da je sustav ocjenjivanja/recenzija u cijelosti zadržan kao i kod tiskanih časopisa. Usporedno se razvija i samoarhiviranje digitalnih tekstova u javno dostupne mrežne arhive. Ono je, od entuzijastičkih aktivnosti pojedinaca i manjih skupina kolega, preraslo u organizirane repozitorije članaka često svrstanih prema tematskom načelu, kao što je, na primjer, PubMed Central za područje biomedicine. Vrlo su se brzo pojavili i repozitoriji pojedinih institucija kojima je svrha digitalna pohrana cjelovite znanstvene produkcije neke ustanove. Sažet pregled novih inicijativa i mogućnosti u SP-pokretu izložio je Silobrčić (5).

*Acta stomatologica Croatica* (dalje: ASCRO) jedini je nacionalni stomatološki znanstveni časopis koji izlazi kontinuirano od godine 1966. Ocjena kvalitete nekog časopisa važna je ponajprije uredniku i izdavaču, jer će bolja ocjena izravno i neizravno pozitivno utjecati na časopis. Nažalost, do danas nije određen jedinstveni kriterij prosudbe kvalitete u znanosti. Postoje različite metode procjene, a prema temeljnom pristupu općenito ih je moguće po-

quality. It is known that ISI databases cover only 5-7% of the worldwide journal production. The latest extensive research has shown that 5,9% of the Croatian scientific journals are indexed in WoS-u.(2) It is completely legitimate for the database owner to evaluate the costs and the profit and to make autonomous decisions. However, the editorial boards are evaluating the global trends in scientific publishing and they are choosing the direction of the development of their publications according to the results they wish to accomplish. (3)

Many non-profit publishers have recognized the possibilities of the latest technology and keep finding alternative models of scientific communication and the improvement of the accessibility of their publications. We are the witnesses of a strong expansion of the internet as a global network. The boost of the e-publishing takes place in the beginning of the 1990ies. Apart from the printed version, numerous journals have started publishing digital editions as well. Those two factors, as well as the constant rise of the prices of the subscriptions, have probably contributed to the appearance of the open access to the information (OA) movement, which is growing stronger in the 2nd half of the 1990s. (4) It is based on the belief that the results of the research, which are financed by public funds, represent a public property and as such have to be accessible by the public. The idea has a growing number of supporters, especially amongst the scientists and non-profit publishers. Hence today we have numerous journals accessible via open access whether it is via editors internet pages or within larger specialised directories/portals such as DOAJ, Hrčak and others. A large number of Croatian journals is also being published at the same time in electronic edition including *Acta stomatologica Croatica* (Online) since 2006. It is important to emphasize that the peer-review system is entirely the same as in the printed journals. At the same time, self-archiving of digital texts via public accessible web pages is also being developed. It started as the enthusiastic activity of the individuals and smaller groups of colleagues, and it has grown into organized articles' repositories often grouped by their subject, such as PubMed Central for biomedical field. Soon after that appear repositories of certain institutions whose goal is digital storage of the complete scientific production of a scientific institution. A brief view of new initiatives and possibilities in OA has been laid out by Silobrčić. (5)

*Acta stomatologica Croatica* (ASCRO) is the only national dental scientific journal published continually from 1966 to this day. The evaluation of the

dijeliti na objektivne i subjektivne (6). Objektivne metode vrjednovanja časopisa temelje se na statističkoj obradi citiranosti njegovih radova, a kod subjektivnih načina radi se o nekom obliku prosudbe stručnjaka. No, unatoč temeljnim karakteristikama, objektivne metode imaju nedostatke koji se očituju u tehničkim ograničenjima bilježenja citata, selektivnom pristupu postojećih citatnih baza, predrasudama prema nekim jezicima ili vrstama rada, problemu vrjednovanja višestrukog autorstva, motiva za citiranje i dr. (7). Zato je za vrjednovanje kvalitete časopisa poželjno primjenjivati više različitih metoda, a citatna analiza daje sliku samo iz jednog kuta gledanja. Na temelju broja citata, u ISI-jevoj statističkoj publikaciji Journal Citation Reports (JCR) izračunavaju čimbenike utjecaja časopisa (Impact Factor, IF) i druge statističke pokazatelje za svaku godinu. ASCRO nije indeksiran u WoS-u, pa zato ne podliježe statističkoj obradi u JCR-u. WoS čine tri baze podataka i to: Science Citation Index Expanded (dalje: SCI-exp), Social Science Citation Index (dalje: SSCI) i Arts & Humanities Citation Index (dalje: A&HCI). Činjenica da časopis nije u korpusu WoS-ovih baza podataka ne znači da citati radova iz toga časopisa nisu u njima registrirani. Drugim riječima, u WoS-u će biti registrirani citati radova iz ASCRO-a, ako su objavljeni u časopisu indeksiranom u toj bazi.

Svrha je istraživanja citatnom analizom utvrditi komunikabilnost časopisa tj. utjecaj radova objavljenih u ASCRO-u na druge radove i znanstvenike. Iz činjenice da znanstvenik citira neki drugi rad, proizlazi direktan zaključak da je citirani rad na neki način utjecao na drugo istraživanje te je zbog toga citatna analiza odabrana kao metoda istraživanja. Kako bi se dobila što točnija slika, posebno su analizirani autorski samocititi.

## **Materijali i postupci**

Citatnom analizom moguće je obuhvatiti citirane radove i one koji citiraju neki drugi rad, a za njih se u hrvatskome jeziku koristi pojam citirajući. Prvo je bilo potrebno izdvojiti skup radova iz ASCRO-a citiranih u WoS-u. Svaki rad identificiran je u bazi sa šest parametara: prezimenom autora, inicijali-

quality of a journal is important first of all to the editor and the publisher, since a better evaluation will have directly and indirectly a positive influence on the journal. Unfortunately, to this day have not been established the unique criteria of the quality evaluation. There are different methods of evaluation. By their basic approach they can be divided into objective and subjective. (6) Objective methods of journal evaluation are based on statistic processing of how many times have their papers been cited, while the subjective methods are based on some sort of evaluation of an expert. In spite of the basic characteristic, the objective methods have their flaws - technical limitatons of noting citations, a selective approach of the existing citing bases, the prejudice towards some languages or types of papers, the problem of evaluating multiple authorship, the motives for citing etc. (7) Therefore, for the evaluation of the quality of the journals it is advisable to use more various methods, while the citing analysis gives a perception from one point of view only. Based on the number of citations in ISI statistical publication Journal Citation Reports (JCR), factors of the influence of the journal are being calculated (Impact Factor, IF) as well as other statistic indicators for each year. ASCRO is not indexed in WoS so it is not a subject to statistical processing in JCR. WoS consists of three bases - Science Citation Index Expanded (SCI-exp), Social Science Citation Index (SSCI) and Arts & Humanities Citation Index (A&HCI). The fact that the journal is not a part of the WoS database does not mean that the citations of the papers in that journal are not registered in that database.

The goal of the research is to determine the communicability of the journal by citing analysis, i.e. the influence of the papers published in ASCRO to the other papers and scientists. The fact that a scientist is citing another paper leads us to the direct conclusion that the cited paper has, in some way, influenced another research and due to that the citing analysis has been chosen. In order to obtain as accurate idea of the citing as possible, authors' self-citations have been particularly analysed.

## **Materials and Methods**

By citing analysis it is possible to encompass both papers which have been cited and those that are citing another paper, and both of them are denoted by the term citing. First of all, it was necessary to separate a group of papers from ASCRO that were cited in WoS. Each paper was identified in the database

ma imena autora, naslovom časopisa, godinom, veskom i početnom stranicom, te su na taj su način povezani citirani i citirajući rad. Uzorak za analizu pribavljen je pretraživanjem SCI-expa od godine 1966., SSCI-ja od godine 1966. i A&HCI-ja od godine 1975., a obuhvaća razdoblje od osnutka baza do srpnja 2007. Od ponuđenih mogućnosti odabran je „Cited reference search“, a pretraživanje je obavljeno po polju „Cited Work“. Budući da ASCRO nije indeksiran u WoS-u, naziv časopisa nije normiran. Poznato je da se u takvom slučaju u bazi pojavljuju različiti oblici naslova časopisa, budući da nije uvijek korištena službena kratica časopisa. U ranijem istraživanju (8) uočene su mnogobrojne pogreške tijekom bilježenja radova te je stvorena pomoćna datoteka s bibliografskim podacima takvih radova. Ona je pomogla u osmišljavanju strategije pretraživanja po polju „Cited Work“, čime se nastojalo obuhvatiti maksimalan broj radova. Kontrolna pretraživanja obavljena su po polju „Cited Author“, no ipak postoji vjerojatnost da nisu izdvojeni svi radovi. Bibliografski podaci dobiveni pretraživanjem uspoređeni su s izvornikom te su identificirane mnogobrojne pogreške ostalih elemenata bibliografskog opisa. Važno je istaknuti da su sve uočene pogreške ispravljene, pa je korigiran broj radova te su daljnje analize rađene s ispravljenim podacima. Tako izdvojen skup spremljen je u tablični program MS Excel 2007 te je obavljena daljnja obrada.

U drugom dijelu istraživanja analizirani su citirajući radovi, tj. pretraživanjem je utvrđeno tko je, gdje, kada i koliko puta citirao rad objavljen u ASCRO-u. Bibliografski zapisi svih citirajućih radova pojedinačno su ručno prebačeni iz WoS-ovih baza u program MS Excel u kojem je obavljena statistička obrada podataka. Za analizu područja kojima pripadaju časopisi citirajućih radova, koristila se podjela iz JCR-a za godinu 2002. U slučaju da neki časopis pripada dvama područjima, odabrano je samo jedno.

## Rezultati

Radi što potpunijeg izdvajanja traženih citata iz baze, ime časopisa pretraženo je kombinacijom grafema *act\* sto\* c\**, te je nakon izlučivanja zapisa koji se odnose na druge časopise, izdvojen skup od 194 članka iz ASCRO-a. Dodatnim pretraživanjem prema autorima, uočeno je više oblika pogrešnih navođenja imena časopisa. Daljnja pretraživanja obavljena su prema sljedećim kombinacijama grafema:

by six parameters: author's surname, initial(s) of the author's forname, journal title, year, volume and first page. They were used to connect cited and citing paper. An analysis specimen was acquired by browsing SCI-exp since 1966, SSCI since 1966 and A&HCI since 1975. The time span it covers is since the foundation of the database until July 2007. Among the offered possibilities, „Cited reference search“ was chosen, and the research was conducted on the base of „Cited work“. Since ASCRO is not indexed in WoS, the journal title is not standardized. It is known that in such cases various forms of journal title appear since the official abbreviation of the journal title is not always used. In the earlier researches (8) numerous errors in recording of the papers have been noticed. Therefore, a supporting datafile with bibliographic data of such papers has been created. It has helped to create a strategy of searching on the base of „Cited work“, trying to cover a maximum number of papers. The control searches were carried out by the field „Cited author“. However, there is a possibility that all the papers have not been identified. Bibliographic data acquired by browsing were compared to the original, and by doing that many errors in other elements of the bibliographic description were identified. It is important to emphasize that all the noticed errors were corrected, which lead to the correction of the number of the papers. Further analysis were conducted with the corrected data. This selection was stored in MS Excel 2007 table, which was used for further processing.

In the second part of the research, citing papers have been analysed, i.e. the browsing determined who, where, when and how many times has cited a paper published in ASCRO. Bibliographic records of all the citing papers were manually transferred from the WoS databases to the MS Excel, which was used to statistically process the data. For the analysis of the fields to which the journals of the citing papers belong to, a division from the JCR for 2002 was used. In case a journal covers two fields, only one was selected.

## Results

In order to single out the needed citations as completely as possible, the journal title was searched using a combination of letters (grafema) *act\* sto\* c\**. After eliminating the records which related to other journals, a group of 194 articles from ASCRO was singled out. By additional search by authors, a number of incorrect citations of journal title were noticed. Further searches were conducted by these let-

act\* som\* cro\* (2 zapisa), act\* str\* cro\* (1 zapis), act\* sto\* scand\* (1 zapis), act\* asto\* cro\* (1 zapis) i ascro (2 zapisa), što ukupno čini 201 članak.

#### A) Analiza citiranih radova

U bazama podataka WoS-a citirani se rad identificira uz pomoć šest parametara, a to su: prezime autora, inicijal(i) imena autora, ime časopisa, godina, svezak i početna stranica. Budući da bilo koji od navedenih parametara može sadržavati pogrešku, napravljena je detaljna analiza dobivenih rezultata tako što su uspoređeni s izvornikom, a pronađene pogreške su ispravljene. Zbog toga je broj radova dobivenih pretraživanjem umanjen s 201 na 185 citiranih radova, i oni čine konačan uzorak za daljnju analizu. Utvrđeno je da su analizirani radovi citirani ukupno 257 puta. Znači da je svaki od citiranih radova dobio prosječno 1,4 citata. Ako znamo da su, u navedenom razdoblju, u časopisu objavljena ukupno 1.273 rada, vidimo da je svaki objavljeni rad citiran prosječno 0,2 puta.

*Pogreške u citiranju:* Analiza pokazuje da je od ukupno 257 citata samo njih 128 (49,8%) navedeno potpuno točno, a 129 radova ima pogrešan najmanje jedan element bibliografskog zapisa. O toga broja 100 citata (38,9%) sadržava jednu pogrešku, 24 citata (9,3%) dvije, a 5 citata (1,9%) po tri pogrešna podatka, što ukupno čini 163 pogreške. Teško je bilo skupiti citate istog rada, ako je pogrešno navedeno prezime autora, a posebice ako se radilo o prvom slovu prezimena (na primjer Poljak i Foljak, Ciglar i Giglar). Primjer u kojem su bibliografski podaci za isti rad navedeni na četiri načina, prikazan je u Tablici 1. – vidi se da ni jedan citat nije u cijelosti točan. Pogrešni dijelovi otisnuti su podebljano, pa tako možemo vidjeti u prvom, trećem i četvrtom citatu pogrešnu stranicu rada, u drugom, trećem i četvrtom pogrešnu kraticu časopisa, a u četvrtom pogrešan inicijal imena autorice.

ter combinations: act\* som\* cro\* (2 records), act\* str\* cro\* (1 record), act\* sto\* scand\* (1 record), act\* asto\* cro\* (1 record) i ascro (2 records) which makes a total of 201 articles.

#### A) Analysis of cited papers

In WoS databases, a cited paper is identified by six parameters which are: author's surname, initial(s) of the author's forname, journal title, year, volume and first page. Since any of the mentioned parameters can contain an error, a detailed analysis of the acquired results was conducted – they were matched to the original and the found errors were corrected. Due to that, the number of papers obtained by the search was decreased from 201 to 185 cited papers, which gives a total of the cited papers that make a final specimen for further analysis. It was determined that all the analysed papers were cited 257 times. It means that each of the cited papers had an average of 1,4 citings. If we know that a total of 1.273 papers were published in the journal in the specified period, we can see that each published paper was cited an average of 0,2 times.

*Errors in citing:* The analysis has shown that out of the total of 257 citations, only 128 citations (49,8%) were completely correct, while 129 papers had at least one incorrect element of the bibliographic record. Hundred citations (38,9%) contains one error, 24 citations (9,3%) has two errors, 5 citations (1,9%) have three errors, which makes a total of 163 errors. It was difficult to gather the citations of the same paper if the author's surname was misspelt, especially if it was the first letter (Poljak and Foljak, Ciglar and Giglar). An example of the bibliographic data being cited for the same paper in four different ways is shown in Table 1, and neither of them was fully correct. Incorrect parts are printed in bold. We can see in the 1st, 2nd and 3rd citation the faulty page number; in the 2nd, 3rd and 4th faulty abbreviation of the journal title; in the 4th faulty initial of the author's forename.

Tablica 1. Primjer pogrešaka u citiranju rada

Table 1 An example of errors in citing a paper

| autor • author | naslov časopisa • journal title | svezak • volume | početna stranica • page | godina • year |
|----------------|---------------------------------|-----------------|-------------------------|---------------|
| VIDAS I        | ACTA STOMATOL CROAT             | 22              | <b>311</b>              | 1988.         |
| VIDAS I        | <b>ACTA STOMATOLOGICA C</b>     | 22              | 31                      | 1988.         |
| VIDAS I        | <b>ACTA STOMATOLOGICA C</b>     | 22              | <b>33</b>               | 1988.         |
| VIDAS L        | <b>ACTA STOMATOLOGICA C</b>     | 22              | <b>311</b>              | 1988.         |

Analizom pogrešaka prema vrsti utvrđeno je da 163 citata (63,4%) sadržavaju najmanje jednu pogrešku. Najviše pogrešaka odnosi se na netočno navedenu kraticu naslova časopisa i to kod 106 citata (65%), a najmanje u bilježenju broja sveska i godine izdavanja kod 6 citata (3,7%) pri čemu se postoci odnose na radove koji sadržavaju pogrešku, a podaci su prikazani u Tablici 2.

The analysis of the types of errors has determined that 163 citations (63,4%) contain a minimum of one error. The largest number of errors relate to the incorrect abbreviation of the journal title in 106 of them (65%). The smallest number of errors relate to the volume and year of publishing in 6 citations (3,7%). The percentages relate to the papers with an error. The data is shown in Table 2.

**Tablica 2.** Zastupljenost pogrešaka prema vrstama  
**Table 2** Proportion of errors per types

| tip greške • error type                         | br.citata •<br>No. of citations | %    |
|---|---------------------------------|------|
| Naslov časopisa = Journal title                 | 106                             | 65   |
| Prezime autora = Author's surname               | 18                              | 11   |
| Inicijal autora = Author's initials             | 17                              | 10,5 |
| Početna stranica rada = First page of the paper | 10                              | 6,1  |
| Svezak = Volume                                 | 6                               | 3,7  |
| Godina izdavanja = Year of publishing           | 6                               | 3,7  |
| Ukupno=Total:                                   | 163                             | 100  |

*Pogrešne kratice naslova časopisa:* Za časopise indeksirane u WoS-u kratice naslova časopisa su utvrđene i standardiziraju se kod unosa novih radova, no Acta stomatologica Croatica nije dio toga korpusa. Zato se naziv časopisa u citiranim radovima javlja u oblicima kako su ga naveli autori citirajućih radova. Službena kratica analiziranog časopisa je Acta stomatol. Croat. prema Međunarodnom uredu za ISSN, no premda je u samom časopisu i u sekundarnim publikacijama uredno istaknuta, pojavljuju se mnogobrojne varijante. Analizom je ustanovljeno da se u bazi javlja na 19 načina. U 151 citatu (58,8%) navodi se službena kratica časopisa, a u 106 (41,2%) radova javlja se 18 ostalih oblika naziva časopisa, što je prikazano u Tablici 3.

*Errors in abbreviations of journal titles:* For the journals indexed in the WoS, the abbreviations of the journal titles are determined and are standardized while entering the new papers. However, Acta stomatologica Croatica is not a part of that corpus. Therefore, the journal title in cited papers appears in forms which were stated by the authors of the citing papers. The official abbreviation of the analysed journal is Acta stomatol. Croat., according to the ISSN International Centre. Although it is emphasized in the journal, numerous other forms have appeared. The analysis has determined that it appears in the database in 19 different forms. In 151 citations (58,8%) the official abbreviation of the journal is quoted, while in 106 (41,2%) papers it appears in the other 18 forms of the journal title, as shown in Table 3.

**Tablica 3.** Kratica naslova časopisa u citatima  
**Table 3** Abbreviation of the journal title in citations

| naslov časopisa • journal title | br. radova • No.<br>of articles | naslov časopisa • journal title | br. radova • No.<br>of articles |
|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| ACTA STOMATOL CROAT             | 151                             | ASCRO                           | 2                               |
| ACTA STOMATOLOGICA C            | 39                              | ACT ASTOMATOL CROAT             | 1                               |
| ACTA STOM CROAT                 | 25                              | ACTA STOATOL CROAT              | 1                               |
| ACTA STOMAT CROAT               | 9                               | ACTA STOMALOT CROAT             | 1                               |
| ACTA STOMATOL CROATI            | 9                               | ACTA STOMATO CROAT S            | 1                               |
| ACTA STOM CROAT S               | 3                               | ACTA STOMATOL                   | 1                               |
| ACTA STOMATOL CROA S            | 3                               | ACTA STOMATOL CROUTI            | 1                               |
| ACTA STOMATOL SCAND             | 3                               | ACTA STOMATOLGOICA C            | 1                               |
| ACTA STROMATOL CROAT            | 3                               | ACTA STOMATOLGOICS C            | 1                               |
| ACTA SOMATOL CROAT              | 2                               |                                 |                                 |



*Analiza broja citata:* U Tablici 4. prikazani su podaci razdiobe radova prema broju citata, uspoređeni na temelju izvornih rezultata pretraživanja te nakon obavljenih ispravaka. Vidljiv je veliki broj radova s jednim citatom, što se moglo i očekivati, a nakon korekcije pogrešaka njihov se broj smanjuje s 81,6% na 75,1%. Broj radova s dva, tri i četiri citata povećava se, a nepromijenjen ostaje jedino broj radova s pet citata, što je i najviše citata po radu.

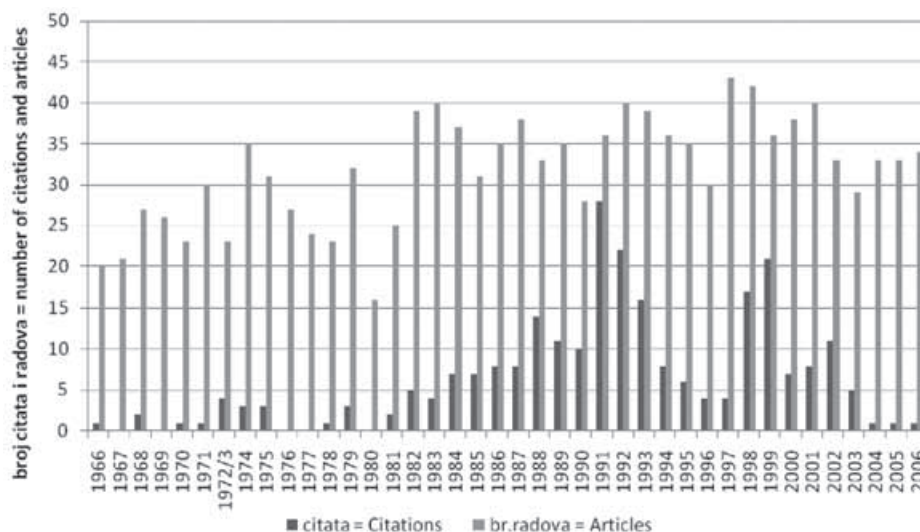
*Analysis of the number of the citations:* Table 4 presents the data of the distribution of papers per number of citations and it is based on the original browsing and after corrections were made. It is visible that a large number of papers has one citation, as expected. After the corrections were made their number is decreased from 81,6% to 75,1%. The number of papers with two, three or four citations is increasing. Only the number of papers with five citations is unchanged, which makes the largest number of citations per paper.

Tablica 4. Razdioba radova prema broju citata  
Table 4 Distribution of the papers per number of citations

| br. citata •<br>No. of citations | radovi izvorno • articles, originally |      | radovi korigirano • articles, corrected |      |
|----------------------------------|---------------------------------------|------|---|------|
|                                  | broj • No.                            | %    | broj • No.                              | %    |
| 1                                | 164                                   | 81,6 | 139                                     | 75,1 |
| 2                                | 23                                    | 11,4 | 27                                      | 14,6 |
| 3                                | 10                                    | 5    | 13                                      | 7    |
| 4                                | 3                                     | 1,5  | 5                                       | 2,7  |
| 5                                | 1                                     | 0,5  | 1                                       | 0,5  |
| Total                            | 201                                   |      | 185                                     |      |

Broj citata po godinama u korelaciji s brojem radova po godinama prikazan je na Slici 1. U analiziranom razdoblju broj citata s manjim oscilacijama kontinuirano raste od 1966. do 1991., kada je zabilježen maksimum od 28 citata. Zatim broj citata znatno pada do godine 1997. (4 citata), da bi 1998. bio zabilježen nagli porast na 17 citata i drugi maksimum - 21 citat godine 1999. Blagi rast uočava se do 2002., a zatim se broj citata smanjuje, što se moglo i očekivati zbog razmjerno kratkog razdoblja od objavljivanja članaka.

Number of citations per years in correlation with the number of papers per year is shown in Figure 1. In analysed period the number of citations with smaller fluctuations is continually growing since 1966 until 1991, when there was a maximum of 28 citations. Afterwards, the number of citations is significantly dropping until 1997 (4 citations), only to suddenly increase to 17 citations in 1998. The second maximum of 21 citations was noted in 1999. A mild increase is visible until 2002, after which a number of citations is decreasing as was mostly expected due to relatively short period od publishing articles.



Slika 1. Broj citata i radova po godini  
Figure 1 The number of citations and papers per year

*Analiza citata prema starosti* prikazana u Tablici 5. - prva kolona prikazuje razliku između godine citiranja i godine objavljivanja rada. Starost korištene literature pokazatelj je recentnosti istraživanja. No, temeljni radovi iz nekog područja mogu vrlo dugo privlačiti pozornost znanstvene zajednice. S druge strane, događa se da neki rad dođe u žarište recentnih istraživanja dosta godina nakon što je objavljen. Za takve radove slobodno se može reći da su bili ispred svojega vremena. Zato može biti zanimljivo utvrditi starost citiranja radova iz ASCRO-a.

*Analysis of the citations per age* is presented in Table 5. The first column shows a difference between the year of citing and the year of publishing the paper. The age of the references is an indicator of the recentness of the research. But, the basic papers of a certain field can draw attention of the scientific community for a long period of time. On the other hand, from time to time a paper can be found in the focus of the recent researches long after being published. We can say that they were ahead of their time. Determining the age of citing the papers from ASCRO can be very interesting.

Tablica 5. Razdioba citata prema starosti rada  
Table 5 Division of citations per age of the article

| starost rada •<br>age of article | br. citata • No. of<br>citations | %   | starost rada •<br>age of article | br. citata •<br>No. of citations | %   |
|----------------------------------|----------------------------------|-----|----------------------------------|----------------------------------|-----|
| 0                                | 8                                | 3,1 | 14                               | 11                               | 4,3 |
| 1                                | 22                               | 8,6 | 15                               | 4                                | 1,6 |
| 2                                | 22                               | 8,6 | 16                               | 3                                | 1,2 |
| 3                                | 24                               | 9,3 | 17                               | 3                                | 1,2 |
| 4                                | 19                               | 7,4 | 18                               | 5                                | 1,9 |
| 5                                | 18                               | 7,0 | 22                               | 2                                | 0,8 |
| 6                                | 19                               | 7,4 | 23                               | 3                                | 1,2 |
| 7                                | 10                               | 3,9 | 24                               | 1                                | 0,4 |
| 8                                | 14                               | 5,4 | 26                               | 1                                | 0,4 |
| 9                                | 14                               | 5,4 | 28                               | 4                                | 1,6 |
| 10                               | 13                               | 5,1 | 29                               | 2                                | 0,8 |
| 11                               | 18                               | 7,0 | 31                               | 1                                | 0,4 |
| 12                               | 6                                | 2,3 | 32                               | 1                                | 0,4 |
| 13                               | 8                                | 3,1 | 34                               | 1                                | 0,4 |

Iz Tablice 5. može se vidjeti da je 8 radova (3,1%) citirano u godini objavljivanja. Broj citata naglo raste na 22 (8,6%) u prvoj i drugoj godini od objavljivanja, a najviše - 24 rada (9,3%) dostiže tri godine nakon objavljivanja. Zatim broj citata blago pada sve do jednog citata 34 godine nakon što je rad objavljen. Dva veća povećanja broja citata uočena su jedanaest i četrnaest godina od objave rada.

Table 5 shows that 8 papers (3,1%) were cited the same year when published. The number of the citations is rapidly increasing from 22 (8,6%) in the 1st and 2nd year of publishing to the maximum of 24 papers (9,3%) three years after publishing. Later the number of citations slowly decreases until there is only one citation 34 years since publishing. Two more significant increases of the number of citations are obvious 11 and 14 years after the paper was published.

#### B) Analiza citirajućih radova

#### B) Analysis of the citing papers

*Analiza prema području kojemu pripada časopis:* Radovi iz ASCRO-a citirani su ukupno u 65 časopisa od kojih 61 pripada SCI-extended bazi, tri pripadaju SSCI bazi, a jedan bazi A&HCI-ja. Analiza znanstvenih područja časopisa prema JCR-u za 2002. i broja citata prema područjima časopisa, prikazana je u Tablici 6. Potrebno je istaknuti da je potpodručje stomatologije u sklopu područja medicinskih znanosti, a radovi su citirani 83 puta u 25 različitih časopisa, što čini 30,1% od ukupnog broja časopisa.

*Analysis per field the journal covers:* Papers from ASCRO were cited in a total of 65 journals, 61 of which belong to SCI-extended database, 3 to SSCI database and 1 to A&HCI database. Analysis of the scientific fields of the journal according to JCR for 2002 and the number of citations per fields of the journal is presented in Table 6. It is necessary to point out that the subfield dentistry is within the field of medical science and that the papers were cited 83 times in 25 different journals, which makes 30,1% of the total number of journals.

**Tablica 6.** Razdioba citata prema području kojemu pripada časopis  
**Table 6** Division of the citations per field the journal covers

| baza i područje • database & mainfields | br.časopisa •<br>No.of journals | br.citata •<br>No.of citations | % citata •<br>citations |
|---|---------------------------------|--------------------------------|-------------------------|
| (A&HCI) Archeology                      | 1                               | 2                              | 0,8                     |
| (SCI-exp) Biological sciences           | 6                               | 8                              | 2,9                     |
| (SCI-exp) Chemistry                     | 3                               | 9                              | 3,3                     |
| (SCI-exp) Engineering                   | 4                               | 5                              | 1,8                     |
| (SCI-exp) Medical sciences              | 45                              | 113                            | 41,1                    |
| (SCI-exp) Materials sciences            | 2                               | 2                              | 0,8                     |
| (SCI-exp) Physics                       | 1                               | 1                              | 0,4                     |
| (SSCI) Anthropology                     | 3                               | 117                            | 42,5                    |

Analiza pokazuje da je najveći broj citata (117) zabilježen u području antropologije u samo tri naslova časopisa. Zatim slijedi područje medicinskih znanosti u sklopu kojega je zabilježeno 113 citata radova iz ASCRO-a, no u 45 različitih naslova časopisa.

U Tablici 7. navedeni su svi časopisi i pripadajući im broj citata, a nazivi časopisa navedeni su prema kraticama iz JCR-a. U sklopu područja medicinskih znanosti posebno je izdvojeno 25 časopisa iz potpodručja stomatologije u kojima su radovi iz ASCRO-a citirani 83 puta.

Analiza pokazuje ekstremno velik broj od 115 citata u časopisu Coll. antropol., što iznosi 44,7%, a u svim ostalim časopisima registrirana su 142 citata ili 55,3%, Tablica 8.

Analysis shows that the largest number of citations (117) is shown in the field Anthropology in only 3 titles of journals. The field Medical science follows with 113 citations of papers from ASCRO but in 45 different titles of journals.

Table 7 states all the journals and their number of citations. The titles of the journals are stated according to the JCR abbreviations. Within the field Medical science 25 journals from subfield Dentistry are selected with papers from ACRO being cited 83 times.

The analysis shows an extremely high number of 115 citations in the journal Coll. antropol. – 44,7%, while in all the other journals 142 citations were registered, i.e. 55,3%, Table 8.

**Tablica 7.** Razdioba citata prema području i časopisu  
**Table 7** Division of the citations per field and journal

| područje • field                            | časopis (broj citata) • journal (No.of citations)   |
|---|---|
| antropologija • anthropology                | Anthropol sci (1), Coll antropol (115), Homo (1)  |
| arheologija • archeology                    | J archaeolog sci (2)  |
| biološke znanosti • biological sciences     | Period biol (2), Bio-med mater sci (1), Biomaterials (2), Med biol eng comput (1), J cran genet dev bio (1), Folia microbiol (1)  |
| kemija • chemistry                          | J chromatogr A (1), J chromatogr B (5), JPC-J planar chromat (3)  |
| inženjerstvo • engineering                  | Acta astronaut (1), Lab robotics automat (1), Strojarsstvo (2), Nahrung (1)   |
| medicinske znanosti • medical sciences      | Croat med j (1), Dermatol clin (3), J am acad dermatol (1), Acta diabetol (2), J gerontol A-biol (3), Forensic sci int (1), Int j legal med (2), Eur j med res (2), Med sci res-biochem (1), B cancer (1), Ann oto rhinol laryn (1), Acta paediatr (1), Jugosl physl pharm a (1), Community dent oral (1), Dentomaxillofac rad (2), Z rheumatol (1), J clin laser med surg (1), Laser med sci (1), Laser surg med (1), Photomed laser surg (3)<br><b>stomatologija • dentistry:</b> Am j dent (2), Angle orthod (5), Arch oral biol (1), Aust dent j (3), Brit j oral max surg (3), Caries res (2), Dent mater (4), Dent traumatol (2), Eur j oral sci (2), Eur j orthodont (5), Int endod j (3), Int j prosthodont (4), J am dent assoc (1), J clin periodontol (2), J dent (3), J dent res (2), J endodont (2), J oral rehabil (22), J periodontal res (1), J prosthet dent (4), Oper dent (5), Oral dis (1), Oral surg oral med o (2), Quintessence int (1), Swed dent j (1) |
| znanost o materijalima • materials sciences | J alloy compd (1)*, J eur ceram soc (1)   |
| fizika • physics                            | Izv AN SSSR fiz+ (1)  |

\* časopis J alloy compd smješten je u područje znanosti o materijalima, iako se u JCR nalazi i u području metalurgija i rudarstvo (Metallurgy & mining) • J alloy compd is placed in material science, although in JCR it can be found in metallurgy and mining.

**Tablica 8.** Broj citata po časopisu  
**Table 8** Number of citations per journal

| br.citata •<br>No. of citations | br.časopisa •<br>No. of journals | naslov časopisa • journal title   |
|---------------------------------|----------------------------------|---|
| 115                             | 1                                | Coll antropol   |
| 22                              | 1                                | J oral rehabil  |
| 5                               | 4                                | J chromatogr B, Angle orthod, Eur j orthodont, Oper dent  |
| 4                               | 3                                | Dent mater, Int j prosthodont, J prosthet dent  |
| 3                               | 8                                | JPC-J planar chromat, Aust dent j, Brit j oral max surg, Int endod j, J dent, Dermatol clin, J gerontol A-biol, Photomed laser surg   |
| 2                               | 16                               | J archeolog sci, Period biol, Biomaterials, Strojarsvo, Am j dent, Caries res, Dent traumatol, Eur j oral sci, J clin periodontol, J dent res, J endodont, Oral surg oral med o, Acta diabetol, Int j legal med, Eur j med res, Dentomaxillofac rad   |
| 1                               | 32                               | Anthropol sci, Homo, Bio-med mater eng, Med biol eng comput, J cran genet dev bio, Folia microbiol, J chromatogr A, Acta astronaut, Lab robotics automat, Nahrung, Croat med j, Arch oral biol, J am dent assoc, J periodontal res, Oral dis, Quintessence int, Swed dent j, J am acad dermatol, Forensic sci int, Med sci res-biochem, B cancer, Ann oto rhinol laryn, Acta paediatr, Jugosl physl pharm a, Community dent oral, Z rheumatol, J clin laser med surg, Laser med sci, Laser surg med, J alloy compd, J eur ceram soc, Izv AN SSSR fiz+ |

*Analiza autorskih samocitata:* U analizi je kao samocitat zabilježen svaki citat u kojemu se bilo koji suautor citirajućeg rada pojavljuje kao suautor citiranog rada. Detaljna analiza pokazuje da je od ukupno 257 citata njih 156 ili 60,7% samocitata. Neovisni citati mogu se shvatiti kao procjena kompetentnih stručnjaka znanstvene grane koji su, za razliku od recenzentata, češće nepoznati.

Radi što kvalitetnije procjene obavljena je analiza suautorstva citirajućih radova. Tako je utvrđeno da su 196 (76,3%) radova objavili samo domaći autori, 54 (21%) rada napisali su isključivo strani autori, a 7 (2,7%) radova objavljeno je u suradnji domaćih i stranih autora. Od 196 radova isključivo hrvatskih autora 116 (59%) su samocitati, od 54 rada isključivo stranih autora 34 (63%) su samocitati, a od 7 radova objavljenih u suautorstvu stranih i domaćih autora 6 (86%) su samocitati.

*Analiza država autora:* Važan pokazatelj komunikabilnosti časopisa svakako predstavlja državna pripadnost autora citirajućih radova, a utvrđeno je da su oni iz 29 zemalja. Najviše citata ASCRO-a zabilježeno je u radovima koje su objavili znanstvenici iz Hrvatske i to 196 radova. Zatim slijede autori iz SAD-a sa 16, iz Bosne i Hercegovine s 5, iz Japana i Velike Britanije s po 4, iz Australije, Brazila i Slovenije s po 3, iz Bangladeša, Danske, Finske, Hong Konga, Italije, Nizozemske, Njemačke i Švedske s po 2 te konačno iz Argentine, Francuske, Irske, Južnoafričke Republike, Kanade, Novog Zelanda, Rusije, Saudijske Arabije, Slovačke, Švicarske, Tajvana, Tajlanda i Turske s po jednim radom. Ako promotrimo situaciju po kontinentima, vidimo da je najviše autora iz 15 europskih država, zatim

*Analysis of the authors' self-citations:* Every citation in which any co-author of the citing paper is the co-author of the cited paper, is considered to be a self-citation in the analysis. A detail analysis shows that in a total of 257 citations 156 (60,7%) are self-citations. Independent citations can be taken as an estimation of the competent experts of the science field who are more often unknown, unlike the reviewers.

In order to achieve the best quality of estimation, an analysis of the co-authorship of the self-citations was made. It was determined that 196 (76,3%) papers were published by domestic authors, 54 (21%) papers were written by foreign authors only and 7 (2,7%) papers were published in co-operation of domestic and foreign authors. Out of 196 papers of only domestic authors, 116 (59%) are self-citations; out of 54 papers of only foreign authors 34 (63%) are self-citations and out of 7 papers published in co-operation of domestic and foreign authors 6 (86%) are self-citations.

*Analysis of the author's countries:* An important indicator of communicability of the journal is definitely the country of origin of the author of the citing papers. It is determined that they come from 29 countries. The largest number of citations from ASCRO was in papers published by the Croatian scientist – in 196 papers. Authors from USA follow with 16, Bosnia and Herzegovina with 5, from Japan and Great Britain with 4 each, from Australia, Brazil and Slovenia with 3 each, from Bangladesh, Denmark, Finland, Hong Kong, Italy, Netherlands, Germany and Sweden with 2 each and, finally, from Argentina, France, Ireland, South Africa, Canada, New Zealand, Russia,

sedam iz azijskih, četiri iz američkih, dva iz austral-skih te jedan iz afričke države.

## Rasprava i zaključci

### A) Analiza citiranih radova

U analizi je zabilježeno ukupno 257 citata koji se odnose na 185 radova iz ASCRO-a, što znači da je svaki od citiranih radova dobio prosječno 1,4 citat. No, uzmemo li u obzir da su u razdoblju od 41 godine u časopisu objavljena ukupno 1.273 rada, svaki je citiran 0,2 puta (9) (10). Rezultati analize hrvatskih STM-časopisa (Science, Technology, Medicine) (2) pokazali su da je svaki citirani rad dobio prosječno 2,6 citata, a prema proračunu na temelju broja ukupno objavljenih radova, svaki od njih dobio je prosječno 0,4 citata. Da bismo usporedili rezultate, moramo naš uzorak suziti na isti raspon godina, a to znači da je početna godina 1975., radovi su zbrojeni do 1998., a citati do 2001. Na taj se način dobilo ukupno 795 radova i 219 citata, što znači da je svaki rad citiran 0,28 puta. Iz navedenoga vidimo da je citiranost ASCRO-a ispod prosjeka hrvatskih časopisa, te možemo zaključiti da je potrebno uložiti daljnji napor kako bi se podignula kvaliteta radova.

Analiza pogrešaka pokazala je da čak 50,2% citata sadržavaju najmanje jedan pogrešan element bibliografskog zapisa. Najveći postotak pogrešaka zabilježen je u citiranju naslova časopisa i to 65% (Tablica 2). Uzmemo li u obzir sve radove, dobit ćemo 41,2% citata s pogreškom, što znači da bi pretraživanjem samo prema službenoj kratlici časopisa našli 58,8% citata. Direktna usporedba tih rezultata s rezultatom od 37% citata s pogrešno navedenim naslovom časopisa u analizi hrvatskih časopisa (2), neće dati pravu sliku. Naime, autori navedenog rada uveli su kategoriju alternativnog naslova temeljem koje nisu identificirali kao pogrešku razlike poput «bioch» i «biochem». Na taj je način više različitih oblika kraćenja prihvaćeno kao ispravan oblik. To možda nije bila najbolja odluka, jer je opće poznato da je službena kratica časopisa samo jedna, a dodjeljuje ju Međunarodni ured za ISSN (ISSN International Centre)<sup>4</sup> preko ureda za ISSN. Kao drugi oblik (alternativne) kratice mogao je biti prihvaćen jedinstven oblik kratice prema WoS-u. To se može činiti prestigim kriterijem, no određen postotak pogrešaka će postojati i kada utvrdimo vrlo stroge kriterije.

Saudi Arabia, Slovakia, Switzerland, Taiwan, Thailand and Turkey with 1 paper each. If we observe the situation over the continents, we can see that most of the authors come from 15 European countries, 7 from Asian countries, 4 from American, 2 from Australian and 1 from African country.

## Discussion and conclusions

### A) Analysis of the citing papers

The analysis has noted a total of 257 citations which relate to 185 papers from ASCRO. Each of the cited papers has an average of 1,4 citations. However, since in the 41 year period 1.273 papers have been published in the journal, it means that each paper was cited 0,2 times. (9, 10) The results of the analysis of the Croatian STM journals (Science, Technology, Medicine) (2) have shown that each cited paper has an average of 2,6 citations. According to the estimation based on the number of published papers, each of them has an average of 0,4 citations. To be able to match the results we have to narrow down our specimen to the same time period. It means that the starting year is 1975, the papers were summed up until 1998 and the citations until 2001. This way we have a total of 795 papers and 219 citations which means that each paper was cited 0,28 times. We can see that the citedness of ASCRO is below the average of the Croatian journals. We can conclude that it is necessary to put an extra effort in the improvement of the quality of the papers of ASCRO.

An error analysis has shown that as much as 50,2% of citations contain at least one incorrect element of the bibliographic record. The highest percentage of errors is recorded in citing journal titles in 65% (Table 2). If we consider all the papers, there are 41,2% citations with an error, which means that when searching by official abbreviation of the journal title we would find only 58,8% citations. A direct comparison of these results to the result of 37% citations with incorrectly stated journal title in the analysis of the Croatian journals (2) will not give a realistic image. The authors of the stated paper have introduced a category of an alternative title. Based on that category they did not identify a difference such as bioch and biochem as an error. That way a number of different forms of abbreviating was accepted as correct. That may have not been the best decision since it is known that there is only one official abbreviation of the journal and it is given by the ISSN International Centre<sup>iv</sup> via national ISSN centres. A unique form of abbreviation according to the WoS could have been accepted as a second form of the (alternative) abbreviation.

Odstupanjem od njih smanjuje se mogućnost identifikacije naslova te zbog toga i pridruživanje pripadajućih citata pravom radu, što nikome ne bi trebalo biti u interesu. Velik nedostatak WoS-a jest taj što se za identifikaciju časopisa ne koristi službenim kraticama, nego časopisima dodjeljuje svoje kratice. Osim toga, dodatni izvor problema je definiranje veličine polja naslova časopisa u SCI-u na maksimalno 11 znakova, a u SCI-expanded na 21 znak. Kratica ASCRO-a je u citatima navedena na 19 različitih načina, a samo je jedan točan (Tablica 3, prvi zapis).

Najviše radova ima po jedan citat i to 81,6% (nakon korekcije pogrešaka 75,1%), što je potpuno očekivano, a najveći broj citata po radu je 5 (Tablica 4.).

*Analiza citata i broja radova po godinama* prikazana je na Slici 1. Broj citata s manjim oscilacijama raste od 1966. do 1991. kada dostiže maksimum od 28 citata. Zatim sljedećih šest godina broj citata pada, 1998. znatno raste, a godine 1999. dostigao je drugi vrhunac od 21 citata. Istodobno se ukupni broj radova po godini od 1966. do 2006. kreće između 16 radova 1980. i 43 rada 1997. Iz Slike 1. nije moguće dovesti u korelaciju veći broj radova s povećanjem broja citata. Jedino je rad s najvećim brojem citata po radu (5) objavljen 1991. znatno utjecao (18%) na maksimum citata iste godine. Opći zaključak je da se samo jedan rad statistički znatno izdvojio, a u ostalim godinama uglavnom je više radova dobilo manji broj citata i time utjecalo na citiranost ASCRO-a.

*Analiza citata prema starosti:* Iz Tablice 5. vidi se da je u nultoj tj. godini objavljivanja rada, citirano 8, odnosno 3,1% radova. Do pojave elektroničkih, online izdanja, dostupnost ASCRO-a ovisila je o klasičnom sustavu distribucije, pa se može pretpostaviti da se u nultoj godini radi o samocitatima, jer su uglavnom autori imali informaciju o izlasku određenog rada u istoj godini. Detaljnom provjerom svakog citata pretpostavka je potvrđena. Broj citata naglo raste na 22 (8,6%) u prvoj i drugoj godini od objavljivanja, a u trećoj dostiže maksimum od 24 (9,3%) citata. Zatim broj citata s godinama kontinuirano pada uz blaže oscilacije, što je u skladu s očekivanom normalnom distribucijom, a najstariji je citat iz 34 godine starog rada.

This can seem too harsh a criteria, but a certain percentage of errors will exist even if we set very strict criteria. By discarding them the possibility of identification of the journal is decreased, as well as relating the citations to their paper which should not be in anyone's interest. To identify a journal WoS does not use the official abbreviations, instead it uses its own abbreviations which is a great draw-back. Apart from that, an additional source of problems is defining the size of the title field in the SCI to the maximum of 11 letters, and 21 letter in SCI-expanded. ASCRO abbreviation was cited in 19 different ways, only one of which was correct (Table 3, 1st record).

Most papers have only 1 citing which makes 81,6% of all the papers (75,1% after correction of errors), as expected, and the largest number of citations per paper is 5 (Table 4).

*Analysis of the citations and the number of papers per years* is presented in Figure 1. The number of papers is growing since 1966 until 1991, with fewer fluctuations, when it reaches its maximum of 28 citations. For the next six years the number of citations is dropping, only to significantly increase in 1998 and reach its peak in 1999 with 21 citations. At the same time, the total number of papers per year since 1966 until 2006 was between 16 papers and 43 papers in 1997. From Figure 1 it is not possible to relate a larger number of papers to the increase in citations. Only the paper with the largest number of citations per paper (5) published in 1991 had a significant influence (18%) to the maximum of citations in the same year. A general conclusion is that only one paper is significantly statistically distinct, while in the other years usually more papers had fewer citations and influenced the number of citations of ASCRO.

*Analysis of the citations per age:* Table 5 shows that in the year of publishing the paper 8 papers (3,1%) were cited. Until launching the online edition, the accessibility of ASCRO depended on the classic system of its distribution. It was possible to presume that in the year of publishing the paper we are talking about self-citations because it was mainly the authors who had the information on publishing a specific paper in that year. A detail checking of each citing confirmed that presumption. The number of citations is suddenly increasing to 22 (8,6%) in the 1st and 2nd year of publishing and reaches the maximum of 24 (9,3%) citations in the 3rd year. After that, the number of citations continually decreases over the years with minor fluctuations, according to the expected normal distribution. The oldest citation is the one of the 34 years old paper.

### B) Analiza citirajućih radova

*Analiza prema području kojemu pripada časopis:* Radovi iz ASCRO-a citirani su u 65 časopisa - od toga 61 pripada SCI-expanded bazi, tri časopisa su iz SSCI-baze i jedan časopis iz A&HCI-baze. Detaljna analiza prema znanstvenim područjima časopisa (prema JCR-u) pokazuje da je najviše citata - 117 (42,5%) zabilježeno u samo tri časopisa iz područja antropologije, zatim 113 (41,1%) citata u 45 časopisa iz područja medicinskih znanosti (od toga 25 iz potpodručja stomatologije), a ni jedno od preostalih šest područja ne prelazi pojedinačno 3,3% citata (Tablica 6. i 7.). Tablica 7. donosi broj citata po časopisu sa 115 (44,7%) citata u samo jednom časopisu, a to je Collegium antropologicum. U sljedećem časopisu - J. oral rehabil. - zabilježena su tek 22 (8,6%) citata. Ni u jednom od preostalih 63 časopisa nije zabilježeno više od 5 citata. Razlog takvoga izdvajanja jednog časopisa može biti multidisciplinarno istraživanje znanstvenika Zavoda za dentalnu antropologiju Stomatološkog fakulteta i hrvatskih antropologa. Osim toga, u ranijem istraživanju produktivnosti Stomatološkog fakulteta (8), utvrđeno je da su znanstvenici Fakulteta u časopisu Coll. antropol. objavili 39,9% radova. U sljedećem časopisu J. dent. res., objavili su 12,1% radova, a u časopisu J. oral rehabil. 5,4% radova, a znatno su manje radova objavili u ostalim naslovima. Pozitivna korelacija između broja objavljenih radova u časopisu i broja dobivenih citata iz istog časopisa, vidljiva je kod prvog i trećeg naslova, dok su u J. dent. res. zabilježena samo dva (>0,01%) citata. Nažalost, ASCRO nije u WoS-u, pa nije bilo moguće obaviti dio analiza koje bi dale znatno potpuniju sliku.

*Analiza autorskih samocitata:* Analiza autora citirajućih radova pokazuje da su od ukupno 257 citata njih 156 (60,7%) samocitati. Objavljene su mnogobrojne analize samocitata pojedinih autora, određenog časopisa, skupine časopisa odabranih prema nekom kriteriju temeljem kojih možemo usporediti naše podatke. Tako, na primjer, vrlo sličan udjel samocitata od 59,6% otkrili su rezultati analize produktivnosti hrvatskih antropologa (11). No, istraživanje šest vodećih svjetskih biomedicinskih časopisa pokazalo je 17% autorskih samocitata u kliničkim časopisima, a 20% u bazično medicinskim časopisima (12). Slični podaci od 18% samocitata istaknuti su u analizi radova o dijabetesu (13). Uočljiva je velika razlika u udjelu samocitata u istraživanjima naših i svjetskih časopisa, što je donekle razumljivo jer su za strane analize odabrani

### B) Analysis of the citing papers

*Analysis per field of the journal:* Papers from ASCRO are cited in 65 journals, 61 of which belong to SCI-expanded database, 3 journals are from SSCI database and 1 journal from A&HCI. A detailed analysis per scientific fields of the journal (according to JCR) shows that the largest number of citations is 117 (42,5%) and it refers to only 3 journals in the field of anthropology. 113 (41,1%) citations is in 45 journals in medical science (25 in subfield dentistry). None of the remaining six fields exceeds 3,3% citations (Table 6 and 7). Table 7 shows the number of citations per journal with 115 (44,7%) citations in only one journal - Collegium antropologicum. In the following journal, J. oral rehabil., there are only 22 (8,6%) citations. None of the remaining 63 journals brings more than 5 citations. The reason for such distinction of a single journal can be due to the multidisciplinary researches of the scientists of the Department for the Dental Anthropology of the School of Dentistry and the Croatian anthropologists. Besides, the earlier research of the productivity of the School of Dentistry (8) determined that the scientists of the School have published 39,9% papers in the journal Coll. antropol. In J. dent. res. 12,1% papers were published and in J. oral rehabil. 5,4% papers were published. A significantly smaller number of papers were published in other journals. A positive correlation between the number of published papers in a journal and a number of acquired citations from the same journal is obvious in the 1st and 3rd title, while only 2 (>0,01%) citations were quoted in J. dent. res. Unfortunately ASCRO is not in WoS, so it is impossible to carry out a part of the analysis that would give a much comprehensive picture.

*Analysis of the authors' self-citations:* Analysis of the authors of the citing papers shows that out of the 257 citations 156 of them (60,7%) are self-citations. Many analyses of the self-citations of certain authors were carried out, as well as those of journals, groups of journals selected by a criteria based on which we can compare our data. For example, a very similar portion of self-citations (59,6%) was presented by the results of the analysis of productivity of the Croatian anthropologists. (11) However, the research of the six major world biomedical journals shows that there are 17% of the authors' self-citations in applied-medical journals and 20% self-citations in fundamental-medical journals. (12) Similar data of 18% of self-citations were determined in the analysis of the papers on diabetes. (13)

vodeći svjetski časopisi s najvećim utjecajem ili tematski radovi iz vodećih časopisa.

Zatim, utvrđeno je da su 196 (76,3%) citata iz ASCRO-a citirali samo domaći autori, 54 (21%) naveli su isključivo strani autori, a 7 (2,7%) citata zabilježeno je u radovima objavljenima u suradnji domaćih i stranih autora. Visok udjel domaćih autora u citirajućim radovima u korelaciji je s udjelom domaćih autora u ASCRO-u (< 80%), što je pokazala bibliometrijska analiza časopisa (9). U časopisu *Acta botanica Croatica* autorice su utvrdile sličan udjel domaćih autora od 72,5%, no analiza je pokazala gotovo obrnut udjel domaćih autora citirajućih radova (22%) u odnosu prema stranima (78%) (14).

Od 196 citirajućih radova objavljenih u suradnji isključivo hrvatskih autora 116 (59%) čine samocitirati, od 54 citirajuća rada isključivo stranih autora 34 (63%) su samocitirati, a od 7 radova objavljenih u suautorstvu stranih i domaćih autora njih 6 su samocitirati. Velik udjel samocitiranih svakako ne utječe pozitivno na sliku komunikabilnosti časopisa, nego je upravo obrnuto proporcionalan.

*Analiza država autora* citirajućih radova pokazuje da su to znanstvenici iz 29 zemalja, a najviše iz Hrvatske, u 196 radova. Zatim slijede autori iz SAD-a sa 16, iz Bosne i Hercegovine s 5, iz Japana i Velike Britanije s po 4, iz Australije, Brazila i Slovenije s po 3, iz Bangladeša, Danske, Finske, Hong Konga, Italije, Nizozemske, Njemačke i Švedske s po 2, te konačno iz Argentine, Francuske, Irske, Južnoafričke Republike, Kanade, Novog Zelanda, Rusije, Saudijske Arabije, Slovačke, Švicarske, Tajvana, Tajlanda i Turske s po 1 radom. Raspodjela prema kontinentima pokazuje da je najviše autora iz 15 europskih država, zatim sedam iz azijskih, četiri iz američkih, dva iz australskih i jedan iz afričke države. Udjel citata stranih autora dosta je dobar pokazatelj međunarodne „vidljivosti“ i komunikabilnosti časopisa.

Rezultati analize pokazuju da ne bismo trebali biti zadovoljni sadašnjim prosječnim udjelom. Vjerujemo da će se situacija mijenjati u pozitivnom smjeru zbog osnutka elektroničkog izdanja časopisa godine 2006., jer je besplatno javno dostupan na internetu. Na taj način časopisu je maksimalno povećana dostupnost i mogu ga čitati znanstvenici koji to dosad nisu mogli (15). Moguće je da će dostupnost časopisa novom krugu znanstvenika povećati broj primljenih rukopisa, što će olakšati postupak odabira i pomoći uredništvu da podigne ukupnu kvalitetu.

There is a large self-citations ratio disproportion between our and international scientific journals. This is somewhat understandable because for international journals' analyses leading journals were chosen with highest impact factors.

Further more, it is determined that 196 (76,3%) of the citations of ASCRO were cited by domestic authors only, 54 (21%) by foreign authors and 7 (2,7%) appear in papers published in co-operation between domestic and foreign authors. A large ratio of domestic authors in cited papers is in correlation with a portion of domestic authors in ASCRO (< 80%) which was demonstrated by the bibliometric analysis of the journal. (9) In journal *Acta botanica Croatica* the authors have detected a similar portion of domestic authors (72,5%), but the analysis has demonstrated an almost reverse share of domestic authors of the citing papers (22%) compared to the foreign ones (78%). (14)

Out of 196 citing papers published in co-operation of the Croatian authors only 116 (59%) are self-citations; out of 54 citations of only foreign papers 34 (63%) are self-citations; out of 7 papers published in coauthorship of foreign and domestic authors 6 of them are self-citations. A large portion of self-citations definitely does not have a positive influence on the image of the communicability of the journal – it is quite the opposite.

*Analysis of the authors' country of origin* of the citing papers demonstrates that the scientists come from 29 countries, mainly from Croatia with 196 papers. Following are authors from USA with 16, from Bosnia and Herzegovina with 5, from Japan and Great Britain with 4 each, from Australia, Brazil and Slovenia with 3 each, from Bangladesh, Denmark, Finland, Hong Kong, Italy, Netherlands, Germany and Sweden with 2 each, and finally from Argentina, France, Ireland, South Africa, Canada, New Zealand, Russia, Saudi Arabia, Slovakia, Switzerland, Taiwan, Thailand and Turkey with 1 paper each. The distribution by continents shows that most of the authors are from 15 European countries, they are followed by 7 Asian, 4 American, 2 Australian and 1 African country. A ratio of the citations of foreign authors is quite a fair indicator of international “visibility“ and communicability of the journal.

The results of the analysis illustrate that we should not be content with the average ratio. We believe that the situation will change in the positive direction due to launching of online edition in 2006, which is available on the Internet free of charge. That way the journal is fully accessible and the sci-



Svaki nacionalni časopis ima mnoge zadaće, pa posredan pozitivan utjecaj na lokalnu zajednicu možda ima veće značenje od neposrednog utjecaja na širu znanstvenu zajednicu. Zato se njegova vrijednost ne može procjenjivati samo na temelju scientometrijskih pokazatelja.

Probleme „malih“ znanstvenih časopisa u malim zemljama kao što je Hrvatska, obradili su mnogobrojni autori, te sugerirali načine kako ih prebroditi (16, 17).

Pritom ne smijemo zanemariti da je časopis analiziran od prve godine izlaza, tj. od 1966. Sve do 1998. većina radova pisana je hrvatskim jezikom, a udjel radova na engleskom jeziku postupno je rastao s razvojem časopisa, no nikad nije prešao 30%. Od godine 1998. časopis počinje izlaziti dvojezično (na hrvatskom i engleskom jeziku) i tek tada je uklonjena jezična zapreka i stvorena jezična pretpostavka za veću „vidljivost“ časopisa u svijetu (9).

Konačno je moguće utvrditi da je ASCRO prisutan u domaćoj i svjetskoj znanstvenoj zajednici, no današnju razinu utjecaja poželjno je povećati. Analiza pokazuje velik broj samocitata i mali udjel citata stranih autora, što su pokazatelji male komunikabilnosti časopisa na svjetskoj razini. Kao opći cilj potrebno je postaviti izvrsnost, za što je nužno daljnje podizanje kvalitete svih segmenata u složenom procesu izdavanja znanstvenog časopisa. Svakom uredništvu časopisa u interesu je primiti što više rukopisa, na što može i treba djelovati pozivanjem na suradnju potencijalnih autora. Povećanjem broja primljenih rukopisa olakšan je odabir kvalitetnijih članaka. Na kraju - samo vrsnoća objavljenih istraživanja može povećati kvalitetu časopisa, što mora biti dugoročni cilj.

entists that have not had the chance to read it will be able to do so (15). It is possible that the accessibility of the journal to the new group of scientists will increase the number of the accepted manuscripts. That will make the selection easier and will assist the editorial board in improving the overall quality of the journal.

Each national journal has numerous tasks. The indirect positive influence on the local community is more important than the indirect influence on the broader scientific community. Therefore, its value cannot be estimated only by the basic bibliometric indicators.

The problems of “smaller“ scientific journals in smaller countries such as Croatia were elaborated by many authors and different paths and methods for their overcoming were suggested (16, 17).

We must not forget that the journal was analysed from the 1st year of publishing, i.e. 1966. Until 1998 the majority of the papers were published in Croatian language. A portion of the papers in English language gradually increased, along with the improvement of the journal, but never exceeded 30%. From 1998 the journal is bilingual (in Croatian and English). Only then a language barrier was removed and the linguistic predisposition for a larger “visibility“ worldwide was achieved. (9)

Finally, it is possible to conclude that ASCRO is present in domestic and foreign scientific community. Still, present level of impact has to be increased. The analysis demonstrates that a large number of self-citations and a small portion of citations of foreign authors does not contribute to the communicability of the journal on the worldwide level. The general goal should be excellence. To achieve it it is necessary to improve the quality of all the segments in the complex process of publishing of a scientific journal. Every editorial board's most important goal is to stimulate potential authors to submit scientific articles. High number of scientific articles submissions means higher incidence of good quality articles. Only acceptance of good quality scientific articles enhances journal strength which should be long-term goal of all editorial boards.

**Abstract**

Bibliometric analysis of the journal Acta stomatologica Croatica (ASCRO) was made for the period of 1966-2006. **Purpose:** The research was to determine a degree of communicability of the journal, i.e. the influence of the papers published in the journal on the other papers and scientists. **Materials and Methods:** Citation analysis was conducted on a specimen acquired by browsing the Web of Science (WoS) databases and the data were processed by descriptive statistics. **Results:** The 185 papers with a total of 257 citations were singled out by a search. Each of the cited papers has an average of 1,4 citations. If we know that a total of 1.273 papers have been published in the journal, each paper has been cited 0,2 times on average. An analysis of the errors has shown that in 50,2% of papers all the elements of the bibliographic record have been cited correctly and a total of 163 citation errors have been made. Most of the errors (65%) are present in the title of the journal. The highest number of citations per paper is 5. The highest number of citations per year is 28, in the year 1991. The division of the citations by age of the paper shows that a maximum of 9,3% citations has been accomplished in the 3rd year of publishing the paper, after which the number of citations has decreased. ASCRO has been cited in 65 journals, mostly (44,7%) in Coll. Antropol. A total of 60,7% self-citations has been registered and 21% of the citations have been quoted by foreign authors only. **Conclusions:** It is finally possible to determine that we should not be content with the present level of influence of ASCRO to the domestic and foreign scientific community. The analysis shows a relatively modest total number of citations, a large number of self-citation and a small share of the foreign authors' citations which doesn't contribute to the communicability of the journal on the worldwide level. Excellence needs to be set as a general goal. In order to achieve that, the level of quality of all of its segments needs to be elevated in a complex process of publishing a scientific journal, especially excellence of published papers.

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**Key words**

Periodicals as Topic; Bibliometrics;  
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