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SYSTEMATIC REVIEW

Occupational therapy for community dwelling elderly people: a systematic review

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Abstract

Objective: occupational therapy might play an important role in maintaining independent living for community dwelling elderly people. The aim of this systematic review is to determine whether occupational therapy improves outcome for people who are ≥60 years and are living independently.

Methods: an extensive search in MEDLINE, CINAHL, EMBASE, AMED and SCISEARCH until July 2002 was performed. Studies with controlled and uncontrolled designs were included. Six intervention categories were distinguished and individually analysed using a best-evidence synthesis, based on the type of design, the methodological quality, type of outcome measures and statistical significance of findings.

Results: 17 studies were included, ten of which were randomised clinical trials. Six randomised clinical trials had a high methodological quality. Strong evidence is present for the efficacy of advising on assistive devices as part of a home hazards assessment on functional ability. There is some evidence for the efficacy of training of skills combined with a home hazard assessment in decreasing the incidence of falls in elderly people at high risk of falling. Some evidence is available for the efficacy of comprehensive occupational therapy on functional ability, social participation and quality of life. Insufficient evidence is present for the efficacy of counselling the primary caregiver of dementia patients about maintaining the patient's functional abilities.

Conclusion: this review shows that occupational therapy interventions for community dwelling elderly people results in positive outcomes. Future research in the efficacy of occupational therapy in elderly patient groups such as people with dementia is recommended. Furthermore, research into tailoring interventions to the needs of elderly patients is recommended.

Keywords: occupational therapy, aged, review literature, meta-analysis, elderly

Background

The increasing elderly population is one of the health care concerns in western societies. The ageing process is associated with decreasing functional abilities, lower quality of life and increasing health care costs for the community (Supplementary data, Appendix 4 available at <http://www.ageing.oupjournals.org>). Governmental policies aim at enhancing or maintaining independent living by providing services and care for community dwelling elderly people. Occupational therapy (OT) might be able to play an important role in reaching this aim.

Community dwelling elderly people are defined by their age (≥60 years of age) and by living independently. This group

can suffer from a large variety of health care problems; from just getting older (not diseases specific) to suffering from multiple pathologies. Also, people with specific medical diagnoses that occur more frequently in an older population, such as stroke, osteoarthritis or dementia, are part of this population.

OT treatment focuses on increasing or maintaining functional independence, social participation and quality of life, both from a preventive perspective and a treatment perspective. A survey in the Netherlands showed that the majority of patients referred to OT in the general health care system were of older age (mean age 61 years) and suffered from a chronic condition [1]. Improving personal

care, domestic and locomotor abilities and enhancing physical independence and mobility were the most frequently chosen treatment goals for this population [1].

OT's efficacy for older people has been reviewed before but none of these reviews addressed the community dwelling elderly people separately. Carlson *et al.* [2] incorporated studies concerning OT for institutionalised elderly people. Patterson *et al.* (Supplementary data, Appendix 5) reviewed the evidence for the efficacy of pre-discharge home visits conducted by the occupational therapist. Therefore, the objective of this systematic review is to determine whether OT improves or maintains outcomes for community dwelling elderly people.

Material and methods

Search strategy and selection criteria

An extensive search until July 2002 was conducted utilising the following resources: MEDLINE (1966), CINAHL (1982), EMBASE (1982), SCISEARCH (1974), AMED (1985), Cochrane Controlled Trials Register, and two Dutch libraries of medical and rehabilitation literature [Dutch National Institute Allied Health Professions (NPI), Netherlands Institute for Health Services Research (NIVEL)].

The computerised search strategy consisted of i) a search strategy for community dwelling elderly people, and ii) a search strategy for OT interventions (Supplementary data, Appendix 1). In addition, the reference lists of all identified studies were scanned and the corresponding authors of papers eligible for inclusion were contacted by mail to identify further studies. Based on title and abstract, the inclusion of articles was performed by two independent reviewers (EMJS, CHME). When in doubt the full article was read. Disagreements were resolved by discussion [3]. The applied inclusion criteria were: i) efficacy studies with either a controlled or an other than controlled design (ODs) such as pre-post tests or time-series. ODs were included because randomised controlled trials (RCTs)/controlled clinical trials (CCTs) are rare in the field of OT and because pilot studies can guide future research. ii) Studies evaluating OT interventions for community dwelling elderly people (≥ 60 years). This includes both OT interventions from a preventive perspective and interventions for older people having multiple pathologies. iii) Primary outcome domains: 'functional ability', 'social participation', 'quality of life', 'incidence of falls' or 'time to institutionalisation'; or secondary 'process' measures, which are measures considered to be indicators of successful treatment: 'sensory-motor functions', 'cognitive functions' or 'depression'. iv) Full-length articles.

Occupational therapy interventions were either regarded as 'comprehensive OT' (when all five specific intervention categories were part of the evaluated OT treatment) or were classified into five specific intervention categories: viz i) training of sensory-motor functions; ii) training of cognitive functions; iii) training of skills; iv) advice and instruction regarding the use of assistive devices; and v) counselling of primary care giver. This classification has its base in the International Classification of Functioning, Disability and Health (ICF) [4] and was used in other reviews on OT [5–7].

A group of four occupational therapists (including EMJS, SJ and EB) and reviewer CHME reached a consensus about this classification by assessing whether the interventions evaluated in each study could be regarded as OT and then allocating them to one of the intervention categories if this was the case. The criteria applied were that the intervention could have been part of an OT treatment plan and that the intervention was aimed at enhancing performance of daily activities. Disagreements were resolved by discussion. Studies evaluating multidisciplinary interventions including OT were excluded because the efficacy of OT cannot be stated in this type of research.

Methodological quality

The methodological quality of all studies was independently assessed by two reviewers (EMJS, SJ or EB). Disagreements were resolved by discussion. If no consensus was reached, a third reviewer (CHME) made the final decision. A list of methodological criteria recommended by Van Tulder *et al.* [3] was used for RCTs and CCTs. This list, containing all criteria proposed by Jadad (Supplementary data, Appendix 6) and Verhagen *et al.* (Supplementary data, Appendix 7), consists of 11 criteria for internal validity, six descriptive criteria and two statistical criteria (Supplementary data, Appendix 2). One modification was made regarding the specification of the criterion 'eligibility'; viz the condition of interest (the impairment or disability that indicated referral to OT) was added as an eligibility criterion, as proposed by Wells (Supplementary data, Appendix 8). All 19 criteria were scored as 'yes', 'no' or 'unclear'. Studies were considered to be of 'high quality' if at least six criteria for internal validity, three descriptive criteria and one statistical criterion were scored positively.

To rate the methodological quality of the ODs, Van Tulder's list was modified with regard to some items inapplicable to ODs. These items were either removed (such as method of randomisation and allocation concealed) or reformulated (such as blinded assessor was reformulated to care provider not involved in outcome assessment) to make them applicable on one patient group design (Supplementary data, Appendix 2). The amended list of criteria consisted of seven criteria for internal validity, four descriptive criteria and two statistical criteria. OD studies were considered to be of 'sufficient quality' if at least four criteria for internal validity, two descriptive criteria and one statistical criterion were met.

Data analysis

Analysis of the results was performed separately for each intervention category. A standardised mean difference [SMD or Hedges' *g*, with 95% confidence interval (CI)] was calculated for continuous variables, and odds ratios with corresponding 95% CI were computed for dichotomous variables. In cross-over trials without a wash-out period between intervention phases, data after the first phase was not included in the review. The primary analysis was focused on comparisons of an OT intervention group with a 'no treatment' control group. If a study compared the effect of more than the two intervention groups, however, two reviewers (EMJS, CHME) decided by consensus how these comparisons would be classified. In the particular case

Table 1. Best-evidence synthesis

Strong evidence:	Provided by consistent, statistically significant findings in <i>outcome</i> measures in at least two high quality RCTs ^a
Moderate evidence:	Provided by consistent, statistically significant findings in <i>outcome</i> measures in at least one high quality RCT and at least one low quality RCT or high quality CCT ^a
Limited evidence:	Provided by statistically significant findings in <i>outcome</i> measures in at least one high quality RCT ^a
or:	Provided by consistent, statistically significant findings in <i>outcome</i> measures in at least two high quality CCTs ^a (in the absence of high quality RCTs)
Indicative findings:	Provided by statistically significant findings in <i>outcome and/or process</i> measures in at least one high quality CCT or low quality RCT ^a (in the absence of high quality RCTs)
or:	Provided by consistent, statistically significant findings in <i>outcome and/or process</i> measures in at least two ODs with sufficient quality (in absence of RCTs and CCTs) ^a
No or insufficient evidence:	In the case that results of eligible studies do not meet the criteria for one of the above stated levels of evidence
or:	In the case of conflicting (statistically significant positive and statistically significant negative) results among RCTs and CCTs
or:	In the case of no eligible studies

^aIf the amount of studies that show evidence is less than 50% of the total number of studies found within the same category of methodological quality and study design (RCTs, CCTs or ODs), we will state no evidence.

of the comparison of two interventions, the predominant contrast had to concern the OT treatment.

We anticipated finding too much diversity among the studies, in terms of interventions (duration, frequency, and setting) and outcome measures (diversity, presentation of the results) to make a quantitative analysis (meta-analysis) appropriate, and we therefore formulated a best-evidence synthesis. Our best-evidence synthesis is based upon the one proposed by Van Tulder *et al.* [8] and was modified for the purpose of this review by attributing levels of evidence to the efficacy of OT, taking into account the design of the studies, the methodological quality, the type of outcome measures and the statistical significance of the findings (Table 1). By excluding low quality studies, a sensitivity analysis was performed.

Results

The search strategy resulted in a list of 1,768 citations. A selection based on title and abstract obtained 147 full articles. Forty-five publications, presenting 38 studies, concerned the efficacy of OT in community dwelling elderly people, 17 of these studies fulfilling all inclusion criteria. Data from three included studies were presented in more than one article [9–12, Supplementary data, Appendix 9–13]. Seven studies (Supplementary data, Appendix 3, 1–7) were excluded because a single subject design was used, or non-community dwelling elderly people or persons younger than 60 years of age participated in the study, or since the outcome measures were beyond the scope of our review. Fourteen other excluded studies [Supplementary data, Appendix 3, 8–22] evaluated a multidisciplinary educational intervention with both OT and public health topics.

The methodological quality was assessed in 12 RCTs/CCTs and five ODs (Supplementary data, Appendix 2). Six RCTs had high methodological quality. Two of the ODs had sufficient methodological quality. The raters disagreed on 24% of the items. Specifically the items ‘co-interventions’, ‘adverse effects’ and ‘intention to treat analysis’ were scored differently. All disagreements were resolved after discussion.

Results of studies that contribute to the outcome of the best-evidence synthesis will be presented separately for each intervention category.

Comprehensive OT

One high quality RCT [9, 10] (Table 2) evaluated OT treatment for independent, living-well, elderly people. Nine months after baseline randomisation statistically significant effect sizes were reported on functional ability (SMD: 0.42 [0.08; 0.77], Table 3), social participation (SMD: 0.48 [0.14; 0.82], not in Table) and quality of life (SMD 0.26 [0.02; 0.50]). Fifteen months after baseline randomisation the outcome for quality of life remained statistically significant (SMD 0.48 [0.13; 0.83], not in Table), whereas the effect sizes for functional ability (SMD 0.32 [−0.03; 0.67], not in Table) and social participation (SMD 0.21 [−0.03; 0.46], not in Table) were no longer statistically significant.

There is limited evidence, therefore, for the efficacy of occupational therapy on functional ability, social participation and quality of life in independent, living-well, elderly people.

Training of skills combined with instruction in the use of assistive devices

Three RCTs [11–13] and two ODs [14, 15] evaluated an intervention in which instructions in the use of assistive devices was combined with training of skills strategies (Table 2). Two RCTs [11, 12] had a high methodological quality.

Both high quality RCTs [11, 12] and the low quality RCT [13] measured the incidence of falling. One high quality RCT [11] reported a statistically significant decrease in falls in elderly people who are at high risk of falling (Table 3). The low quality RCT [13] also measured functional ability for which both after six (Table 3) and 12 months (SMD 2.51 [1.83; 3.20], not in table) statistically significant effect sizes were presented.

Limited evidence exists, therefore, for the efficacy of training of skills combined with the instruction in the use of assistive devices on decreasing the incidence of falls in elderly people at high risk of falling. Furthermore, there are indicative findings that this intervention is effective in maintaining functional ability.

Table 2. Characteristics of included studies

First author	N	Methods	Inclusion criteria	Intervention	Outcome measures	Duration of intervention
Comprehensive OT Clarke [9, 10]	361	RCT	Independent living, >60 years, capacity to benefit from involvement OT	I1: OT programme I2: Social control group R: no treatment Outpatients	Functional status questionnaire Life satisfaction index Rand SF36	I1, I2: 2–2.5 hours a week for 9 months group sessions, maximum 9 hours individual OT
Training of skills combined with instruction assistive devices Cumming [11]	530	RCT	≥65 years, living in community, excluded if OT visit was part of usual care	I: OT home assessment ^a R: usual care, no OT home visit In-, out- and day care patients	Falls	I: 1 hour assessment and telephone follow-up
Pardessus [13]	60	RCT	≥65 years, hospitalised for falling, able to return home, MMSE ≥24	I: OT home assessment ^a R: no treatment Outpatients	SMAF Falls	I: 2 hour assessment
Stevens [12]	1737	RCT	≥70 years, living independently, no adaptation of house previously	I: OT home assessment ^a R: no intervention In community	Institutionalisation Falls	I: 1 home visit
Gitlin [14]	34	OD	Referred to Tag Adept, no specific devices asked, ≥3 chronic conditions	I: OT home assessment ^a At home	ADL-index	I: 2 home visits
Hagsten [15]	17	OD	67–91 years of age, hip fracture surgery	I: OT treatment in hospital, home visit ^a Inpatient + at home	Klein-Bell ADL scale	I: 12 hours per patient in total
Advise/instruction regarding assistive devices Cameron [16]	144	RCT	>74 years, ≥2 falls previously, live in own home	I: Hip-protector wear R: no treatment At home	FES (fear of falling in nine ADL activities)	I: daily when out of bed for 2 years
El Faizy [19]	28	CCT	≥60 years, non-institutionalised	I: home-safety assessment ^b R: home visit no safety assessment At home	Falls	I + R: 1 hour home visit
Gottlieb [20]	159	CCT	ASAP client, potential benefit assistive devices, remain independent	I: provision assistive devices R: no treatment At home	ADL, Perceived difficulty scale	I: 3 home visits
Hart [17]	79	RCT	≥85 years, living in own home, no aids supplied previously	I: home assessment aids provided R: home assessment no aids provided At home	ADL-scale	I + R: 1 home assessment

Table 2. continued

	105	RCT	≥65 years, living independently	I1: home assessment aids provided I2: home assessment no aids provided R: home visit At home I: Transfer pole with colour cue or grey hand-grip At home	Sickness impact profile Life satisfaction index	1 home visit
Liddle [18]						
Cooper [21]	6	OD	≥65 years, living independently, Barthel Index ≥60		Barthel Index	Daily for 3 months
Cooper [22]	30	OD	Elderly women, independent living, Barthel Index ≥60	I1: transfer pole with colour cue I2: transfer pole with colour cue I3: transfer pole without colour cue At home I: Home safety assessment ^b At home	Barthel Index	Daily for 3 months, colour cue changed each month for group I1 and I2
Sonn [23]	27	OD	≥70, living independently, no dementia		ADL, estimated degree of difficulty	1 home visit
Counselling of primary care giver Burgener [24]	54	RCT	Home dwelling patient with Alzheimer's disease or multi-infarct dementia + primary care giver	I1: educational + behavioural programme I2: educational programme I3: behavioural programme R: no treatment At home	ADL scale, functional behaviour care recipient	I1, I2, I3: 1 × 90 minutes home instruction
Gitlin [25]	202	RCT	Care giver lives with dementia patient, patient dependent in ADL Care giver lives with dementia patient, patient dependent in ADL	I: OT treatment R: Usual care At home I: Environmental skill building R: Usual care At home	Functional independence measure patient Functional independence measure patient	I: 5 visits; every other week for 3 months 5 × 90 minutes home training
Gitlin [26]	255	RCT				

OT = Occupational therapy; RCT = Randomised clinical trial; CCT = Controlled clinical trial; OD = other than controlled design; I = intervention group; R = reference group; SMAF = functional autonomy measurement system.

^aThe home assessment included instructions for skill performance.

^bHome safety assessment included the provision of aids.

Table 3. Effects of occupational therapy on functional ability and falling

Reference	Design	Methodological quality	Functional ability		Falling	
			Mean (sd) baseline	SMD [95% CI]	Mean (sd) baseline	Odds [95% CI]
(N)						
Comprehensive OT						
Clarke [9] (361)	RCT	High	I: 77.0 (25.4) R: 72.8(23.3)	0.42 [0.08; 0.77]	–	–
Training of skills combined with instruction assistive devices						
Cumming [11] (530)	RCT	High	–	–	NR	0.39 [0.22; 0.68]
Pardessus [13] (60)	RCT	Low	I: 4.15 (0.28) R: 4.11(0.31)	2.30 [1.64; 2.95]	NR	0.76 [0.28; 2.11]
Stevens [12] (1737)	RCT	High	–	–	NR	0.97 [0.78; 1.28]
Advise/instruction regarding assistive devices						
Cameron [16] (144)	RCT	High	I: 79.9 (20.7) R: 80.4(21.2)	0.42 [0.07; 0.76]	–	–
El Faizy [19] (28)	CCT	Low	–	–	NR	2.40 [0.52; 10.99]
Gottlieb [20] (159)	CCT	Low	NR	NE	–	–
Hart [17] (79)	RCT	High	NR	0.06* [0.01; 0.31]	–	–
Liddle [18] (105)	RCT	High	NR	NS	–	–
Counselling of primary care giver						
Burgener [24] (54)	RCT	Low	NR	NS	–	–
Gitlin [25] (202)	RCT	Low	I: 2.93 (1.49) R: 3.23 (1.36)	0.42 [0.11; 0.72]	–	–
Gitlin [26] (255)	RCT	Low	I: 4.10 (1.86) R: 4.19 (1.90)	0.05 [–0.24; 0.33]	–	–

* = Odds ratio; ADL = activities of daily living; SMD = standardised mean difference; CI = 95% confidence interval; I = intervention group; R = reference group; RCT = randomised clinical trial; CCT = controlled clinical trial; OD = other than controlled design; NR = not reported; NE = not estimable; NS = not significant; – = not assessed.

Advice and instruction regarding the use of assistive devices

Three high methodological quality RCTs [16–18], two low quality CCTs [19, 20] and three ODs [21–23] evaluated the efficacy of a home assessment which included the provision of assistive devices (Table 2). Two ODs [21, 23] were of sufficient quality.

The three high quality RCTs [16–18] measured functional ability. Two RCTs [16, 17] reported statistically significant effect sizes (Table 3).

Consequently, there is strong evidence for the efficacy of a home assessment with incorporation of the provision of assistive devices on increasing functional ability.

Counselling of primary care giver

Three low methodological quality RCTs [24–26] evaluated a counselling intervention for the primary care giver of elderly patients with dementia.

These studies measured the functional ability of the dementia patients. One RCT [25] reported a statistically significant effect size between the intervention and the control group (Table 3).

There is insufficient evidence, therefore, for the efficacy of counselling of the primary care giver of patients with dementia on maintaining or enhancing functional abilities of those patients.

Discussion

This systematic review explored the efficacy of several occupational therapy interventions for community dwelling elderly people. Six intervention categories were individually analysed for their efficacy on the outcome measures of functional ability, quality of life and the incidence of falling. This review established strong evidence for the efficacy of advising assistive devices as part of a home hazard assessment on functional ability. Limited evidence was found for the efficacy of advising assistive devices combined with training of skills strategies in decreasing the incidence of falls in elderly people at high risk of falling. Furthermore, limited evidence was established for the efficacy of comprehensive OT on functional ability, social participation and quality of life. Insufficient evidence was found for the efficacy of counselling the primary caregiver of dementia patients in maintaining the patient's functional abilities.

The results on functional ability, social participation and quality of life are consistent with the conclusions presented by Carlson *et al.* [2]. In their meta-analysis on occupational therapy for mainly institutionalised older persons they presented a statistically significant effect size (0.51) for functional and psycho-social outcomes. The results on falling support the conclusions on home hazard assessment interventions presented by Gillespie *et al.* [27]. They concluded in their Cochrane review that professionally prescribed home hazard assessment and modifications are effective in reducing falls. The results of these three reviews, covering specific health services for elderly people, show the same tendency towards efficacy. So, there is convincing evidence that occupational therapy for elderly people can result in positive outcomes on functional ability and the prevention of falls.

The results from this 'broad scope' systematic review should be considered regarding the possibility of bias to positive outcomes related to the used approach of data-synthesis. Original studies were too heterogeneous to perform a meta-analysis. A best-evidence synthesis incorporating methodological quality, statistical significance of results and type of design was applied. This best-evidence synthesis seems to be a strict one and did, in another review [5], not lead to more positive results than the meta-analysis approach. Another limitation could be the inclusion of several primary outcomes. There is not one primary outcome that reflects the aims of OT and no consensus is established about a 'core set' of outcomes within the profession. The chosen outcomes domains are consistent with other reviews on the efficacy of OT (Supplementary data, Appendix 15) and were separately analysed. However, the use of several outcomes enhances the possibility of positive results.

Because of the choices made in this review, the conclusion that there is insufficient evidence for the efficacy of 'counselling of primary caregiver' should be critically reflected. Our review focused on the benefit of OT for elderly patients and did not incorporate outcomes related to the caregiver. However, the main goal of counselling of the primary caregiver intervention is not only to maintain or increase the patient's functional abilities, but also to reduce caregiver distress in handling behaviour problems in dementia patients when performing activities of daily living. Important outcome measures such as handling difficult patients' behaviour and well-being of the caregiver were not incorporated in our review. So, to address the efficacy of OT counselling of the primary-caregiver, future reviews should be expanded with these important outcome measures.

The search strategy in this review aimed at finding OT studies for community dwelling elderly people. This included both healthy elderly people who received OT from a preventive perspective and people aged 60 or older with a large variety of diseases and co-morbidities. Diagnosis-specific keywords were not incorporated in the search strategy, for this would have extended the strategy too much. Therefore, it might be possible that studies evaluating interventions for elderly people with a specific diagnosis that would be eligible for inclusion in this review were not retrieved because studies might not have been indexed as 'aged' or as

'frail elderly' studies. On the other hand, studies about the efficacy of OT for important patient categories such as stroke, rheumatoid arthritis, Parkinson's disease and multiple sclerosis [5–7, 28] were known to the reviewers and were considered for inclusion in this review. So, it is not likely that key publications about the efficacy of OT for community dwelling elderly people were missed.

In our review we made a distinction between interventions solely aimed at advising and instructing the use of assistive devices, and interventions aimed at advising and instructing the use of assistive devices combined with training of skills. The difference between both categories is that the latter incorporates the adaptation of skills. By means of a careful analysis of activities of daily living, the occupational therapist adapts skills or activities to the individual demands to improve ADL performance [29, Supplementary data, Appendix 14]. This main OT feature reflects the client-centred problem-solving attitude of OT. Van Haastregt *et al.* [30] concluded in their review about preventive home visits that tailoring the interventions to the needs of the subjects involved might be an important aspect of the effectiveness of interventions. Also, the results found in the RCT on comprehensive OT for independent-living older adults [9] suggest that the OT profession's emphasis on occupation is the main determinant for the efficacy reported. Thus, one can hypothesise that this feature is one of the most important determinants of the efficacy of OT. Further research into this topic would be worthwhile.

In conclusion, this review shows that comprehensive occupational therapy and specific OT interventions including training of skills and the instruction of assistive devices in later years result in positive outcomes on functional ability. Future research in the efficacy of occupational therapy for specific elderly patient groups, like people with dementia, is recommended. Furthermore, research into specific features of OT interventions, such as tailoring interventions to the needs of patients, might contribute to enforcing the efficacy of OT in community dwelling elderly people.

Key points

- Comprehensive occupational therapy can be effective in maintaining functional ability, social participation and quality of life for community dwelling elderly people.
 - Home hazards assessment by an occupational therapist is effective in increasing functional ability.
 - Occupational therapy can be effective in decreasing falls in elderly at high risk of falling.
 - Research on the efficacy of occupational therapy for dementia patients living in the community is needed.
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For additional references see Supplementary data, Appendix 4–15 available at <http://www.ageing.oupjournals.org>.

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